



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Guide for Developing and
Evaluating Repair Station and
Quality Control Manuals

Date: 3/19/09

AC No: 145-9

Initiated by: AFS-300

Change: 1

1. PURPOSE. This advisory circular (AC) has been revised to update contract maintenance information.

2. PRINCIPLE CHANGES. This change updates information on contract maintenance.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
i and iii	7/3/03	i and iii	3/19/09
32 through 35	7/3/03	32 through 35	3/19/09

ORIGINAL SIGNED by
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1. PURPOSE. This advisory circular (AC) provides information material for all repair station certificate holders or applicants under Title 14 of the Code of Federal Regulations (14 CFR) part 145 to develop and evaluate a Repair Station Manual (RSM) and Quality Control Manual (QCM). This AC describes an acceptable, but not the only means, to develop a manual and comply with the referenced regulations.

2. CANCELLATION. This AC cancels AC 145-3, Guide for Developing and Evaluating Repair Station Inspection Procedures Manuals, dated February 13, 1981.

3. RELATED 14 CFR PARTS. Title 14 CFR parts 1, 21, 43, 65, 91, 121, 125, 129, 135, and 145.

4. DEFINITION OF TERMS.

a. Acceptable. Data that meets the requirements of the applicable regulations.

b. Accountable Manager. The person designated by the certificated repair station to be responsible for and have authority over all repair station operations conducted under part 145. This person's duties include ensuring that repair station personnel follow regulations, and serving as the primary contact with the Federal Aviation Administration (FAA).

c. Approved. Approved by the Administrator unless used with reference to another person. Approval is granted to a repair station when the information, such as a process specification or rating, is listed on the operations specifications (OpSpecs).

d. Article. An aircraft, airframe, aircraft engine, propeller, appliance, or component part.

e. Contracting. Entering into an agreement between the originating certificated repair station and another person or people to perform maintenance functions on an article. The originating repair station will exercise the privileges of its certificate and assume responsibility for the work performed by the contracted person(s).

f. Correction. An action taken to eliminate a detected nonconformity. For repair stations electing to use an International Organization for Standardization (ISO 9000) quality system, a correction may involve repair or rework and may be made in conjunction with a corrective action.

g. Corrective Action. An action taken to eliminate the cause of a detected nonconformity or other undesirable condition to prevent its reoccurrence. For repair stations electing to use an ISO 9000 or similar system, the undesirable condition may include potential regulatory violations, which differs from a nonconformity requiring correction.

h. Designated Engineering Representative (DER). A private person designated by the FAA Administrator to act as its representative for examining, inspecting, and testing aircraft and related data. A DER may recommend approval or approve data within the limitations of his or her certificate of authority.

i. Directly in Charge. Responsible for the work of a certificated repair station that performs maintenance, preventive maintenance, alterations, or other functions affecting aircraft airworthiness. A person directly in charge doesn't need to physically observe and direct each worker constantly, but must be available for consultation on matters requiring instruction or decision from higher authority.

j. Line Maintenance.

(1) Any unscheduled maintenance resulting from unforeseen events; or

(2) Scheduled checks that contain servicing and/or inspections that do not require specialized training, equipment, or facilities.

k. Maintenance. Inspection, overhaul, repair, preservation, and the replacement of parts, excluding preventive maintenance.

l. Maintenance Function. A step or series of steps in the process of performing maintenance, preventative maintenance, or alterations, which may result in approving an article for return to service.

m. Major Alteration. An alteration not listed in the aircraft, aircraft engine, or propeller specifications that:

(1) Might appreciably affect weight, balance, structural strength, performance, power plant operation, flight characteristics, or other qualities affecting airworthiness; or

(2) Is not done according to accepted practices or cannot be done by elementary operations.

n. Major Repair. A repair that:

(1) If improperly done, might appreciably affect weight, balance, structural strength, performance, power plant operation, flight characteristics, or other qualities affecting airworthiness; or

(2) Is not done according to accepted practices or cannot be done by elementary operations.

o. Operations Specifications (OpSpecs). The official document that describes the authorizations, ratings, and limitations of the repair station.

p. Preventive Action. An action taken to eliminate the cause of a potential nonconformity or other potentially undesirable situation. For repair stations electing to use an ISO 9000 system, preventative action is taken to prevent an occurrence, whereas corrective action is taken to prevent a reoccurrence. For a repair station using an American Society for Quality (ASQ) system, preventative action is taken to remove or improve a process to prevent potential future occurrences of a nonconformance.

q. Preventive Maintenance. Simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

r. Procedure. A specified way to perform an activity or a series of steps, such as a procedure that describes the methods, steps, or means to carry out policy.

s. Quality Control Manual (QCM). A manual that describes the inspection and quality control procedures used by the repair station.

t. Rating. A part of the repair station's certificate that describes the special conditions, privileges, or limitations issued under part 145, §§ 145.59 and/or 145.61.

u. Repair Station Manual (RSM). A manual that describes the procedures and policies of a repair station's operations.

v. Required Inspection Item (RII). An item of maintenance that, if not performed properly, or done with improper parts or materials, could result in a failure, malfunction, or defect, endangering the safe operation of the aircraft. An RII must be inspected by a trained, qualified, and authorized inspector. The inspector must be listed on the repair station's roster but can't be the same individual who performed the work. See parts 121, 125, and 135, §§ 121.371, 125.251, and 135.429 for details of this requirement.

w. Supervisor. A person who directs the work performed under the repair station's certificate and OpSpecs and is available in person at the repair station when work is being performed. See part 145, § 145.153 for supervisory personnel requirements.

5. BACKGROUND. The FAA has revised part 145, the regulation for repair stations because many of the former repair station regulations did not reflect advancements in the repair station business, and technologies. Part 145 reorganizes the requirements applicable to repair stations to reduce duplication of regulatory language and eliminate obsolete information. It also clarifies the minimum requirements for an RSM, introduces a QCM, and describes the items that should be included in these manuals.

CONTENTS

Paragraph	Page
CHAPTER 1. GENERAL INFORMATION.....	1
1-1. Purpose.....	1
1-2. The Manual(s).....	1
1-3. Combining Portions of the Repair Station Manual with the Quality Control Manual.	3
1-4. Identification and Control of Sections.	4
1-5. Sample Procedure Formats	5
CHAPTER 2. MANUAL REVISION AND CONTROL	11
2-1. Procedures for Revision.....	11
2-2. Provisions for Control.....	12
2-3. Electronic Format.....	12
CHAPTER 3. REPAIR STATION ORGANIZATION CHART	15
3-1. Organization Chart.....	15
3-2. Duties and Responsibilities.....	16
CHAPTER 4. REPAIR STATION AND QUALITY CONTROL MANUAL ELEMENTS	19
4-1. Repair Station Personnel Roster	19
4-2. Operations, Housing, Facilities, Equipment, and Materials	21
4-3. Capability List.....	23
4-4. Training Program Revision.....	26
4-5. Work Performed at Another Location	27
4-6. Maintenance, Preventive Maintenance, and Alterations Performed for Air Carriers Under Parts 121, 125, 129, and 135.....	29
4-7. Contract Maintenance Information	32
4-8. Proficiency of Inspection Personnel	37
4-9. Current Technical Data.....	39
4-10. Inspection and Quality Control System.....	41
4-11. Required Records and Recordkeeping.....	50
4-12. Calibration of Measuring and Test Equipment.....	53
4-13. Taking Corrective Action on Deficiencies.	56
APPENDIX 1. FORMS (2 pages)	1
APPENDIX 2. CHECKLIST (12 pages).....	1

CHAPTER 1. GENERAL INFORMATION

1-1. PURPOSE. This document is a guide for developing and evaluating the RSM and QCM required by part 145, §§ 145.207 through 145.211. This guide *does not* provide a complete sample RSM and QCM for all repair stations. The examples included illustrate one of many possible ways to comply with the regulations.

1-2. THE MANUAL(S).

a. Combining Information. The applicant/certificate holder may combine portions required by part 145, § 145.209 with portions required by § 145.211 into one section or chapter of the manual system. For example, the procedures required in § 145.209 for RSM revision and the procedures required in § 145.211 for QCM revision could be combined into one chapter/section titled, "Manual Revision." Additionally, the repair station may use applicable portions of its ISO manual or other quality system, such as ASQ, to show compliance with part 145.

b. Accessibility. The repair station's manual(s) must remain current and be accessible to repair station personnel, as required by part 145 subpart D. The manual(s) may contain more procedures than required by the regulations for the certificate holder to describe the repair station's overall functions, responsibilities, and quality control procedures. Procedures described in the manual(s) should ensure that the repair station could satisfactorily perform maintenance in accordance with (IAW) its rating(s). In that regard, a repair station with a Limited Specialized Service Rating would have different procedures in its manual system criteria than a repair station with a Class 3 Airframe Rating. Each manual system should be developed based on the repair station's authorized ratings and the size and complexity of the repair station.

c. Checklist. The checklist in Appendix 2 may be used to assist the applicant/certificate holder in reviewing the content of its manual(s). All items listed on the checklist may not be applicable to each repair station due to differences in rating, size, and type of maintenance performed.

d. Submit the Manual. The applicant/certificate holder may submit the manual(s) to the FAA certificate-holding district office (CHDO) on paper or electronically. If the repair station submits the manual as part of an initial certification, the manual may be submitted together with related documents, such as the application form and repairmen applications, to the CHDO. If the repair station submits the manual electronically, they should discuss the format, software, and revision procedures with the CHDO before submittal. All submissions will require a cover letter. The repair station should follow the procedures described in its manual when submitting revisions to an existing manual (see Chapter 2, Manual Revision and Control).

e. Required Content. The basic regulatory requirements for manual content are listed below and will be discussed in detail in the following sections of this AC.

(1) RSM Elements.

(a) Manual Revision and Notifying the CHDO.

- (b) Identification and Control of Sections of the Manual.
- (c) Organization Chart:
- Identify each management position
 - The area of responsibility assigned to each management position
 - Duties and responsibilities
- (d) Rosters—Procedures for Maintaining and Revising.
- (e) Description of Operations, Including the Housing, Facilities, Equipment, and Materials.
- (f) Capabilities List—Procedures for (if applicable):
- Revision
 - CHDO Notification
 - Self-Evaluation Before Revision
 - Methods
 - Frequency
 - Reporting Results
- (g) Training Program—Procedures for:
- Revision
 - Submitting to CHDO
- (h) Procedures Governing Work Performed at Another Location.
- (i) Procedures for Maintenance, Preventive Maintenance, or Alterations for Air Carriers.
- (j) Contracting—Procedures for:
- Maintaining and revising the list of approved maintenance functions, including submitting revisions to the CHDO
 - Maintaining and revising the list of contract maintenance providers, including submitting revisions to CHDO
- (k) Required Records and Recordkeeping System.

(2) QCM Elements.

(a) Revision Procedures and Notifying the CHDO.

(b) Qualifying and Surveilling Noncertificated Persons Performing Maintenance, Preventative Maintenance, or Alteration for the Repair Station.

(c) Establishing and Maintaining Proficiency of Inspection Personnel.

(d) Establishing and Maintaining Current Technical Data.

(e) Inspection System:

- Incoming raw material inspection
- Preliminary inspection
- Hidden damage inspection
- Final inspection and return to service

(f) Calibration of Measuring and Test Equipment, Including Intervals of Calibration.

(g) Corrective Action.

(h) Samples of Inspection Forms and Instructions for Completion (may be a separate manual).

(3) Portions Recommended for Most Manuals.

(a) Table of Contents.

(b) List of Effective Pages.

(c) Record of Revisions.

1-3. COMBINING PORTIONS OF THE REPAIR STATION MANUAL WITH THE QUALITY CONTROL MANUAL.

a. Possible Combination. The following chart illustrates one of several possible combinations that applicants/certificate holders could use to structure a single manual system. It includes the procedures required in both the RSM and the QCM. Other combinations may be possible depending upon the ratings, size, and complexity of the repair station. The manual's content must include the applicable procedures required by the regulations, but may be formatted in any manner easily understood by employees of the repair station.

NOTE: A part 145 repair station that also holds an air carrier certificate may refer to sections of its air carrier approved maintenance program in its

part 145 manuals. If the manuals are structured in this manner, those sections must adhere to part 145 regulatory requirements. The affected sections would apply to aircraft listed on the air carrier OpSpecs or to other third party air carriers or aircraft owners that are serviced by the certificate holder.

b. Meeting the Requirements. The repair station should include a table to show the FAA that its manual system meets the requirements of §§ 145.209 and 145.211.

1-4. IDENTIFICATION AND CONTROL OF SECTIONS.

a. Page Numbering. Sequential numbering of the manual(s) from front to rear may cause difficulty for the revision process. A minor revision to one of the first pages may cause a change in the content of each successive page. The FAA advises the repair station to divide the manual into several sections, so that a revision to one page of a section does not affect the entire manual.

b. Related Subject Matter. Most RSMs are divided into sections of similar subject matter. For instance, one section of the manual may contain all of the procedures related to the inspection system. The repair station may establish these sections or the sections may be contained within an established industry format (such as ISO). The sample formats included in this chapter contain a few examples of the many possible methods used for identification. The sections may consist of several similar individual procedures grouped together through a common numbering system, or several similar procedures described in narrative format within a section. Regardless of the method used, each section must be identified and controlled.

c. Table of Contents. Many RSM sections are controlled using a table of contents. The table of contents lists each section of the manual and the location in the manual. Some repair stations choose to reissue a complete section of the manual if any page within that section is revised. The table of contents for those facilities may indicate revision status for each section, rather than each page.

d. Master Document Control List. Some RSMs are controlled using a master document control list. This document lists each procedure and the revision status of that procedure. A unique number and revision status should identify each procedure within the manual system. If a page within a procedure is revised, the entire procedure is reissued. In this system, each procedure is identified and controlled, rather than each section.

e. Section Control. The procedures to control sections of the manual should address (as applicable):

- (1) Identification.
- (2) Revision status.
- (3) Page numbering.
- (4) Issue date.

(5) Approvals of internal personnel responsible for the manual and revisions.

EXAMPLE.

Repair Station Manual Element	+	Quality Control Manual Element	=	Possible Chapter/Section Title
Training program, revision, notifying CHDO	+	Establishing and maintaining proficiency of inspection personnel	=	Training
Maintaining and revising contract information	+	Qualifying and surveilling noncertificated persons	=	Contracting
Manual revision, CHDO notification, identification, and control of sections	+	Manual revision and CHDO notification	=	Manual Control
Records and recordkeeping system	+	Establishing and maintaining current technical data	=	Document Control
Etc.	+	Etc.	=	Etc.

f. Additional Combinations. Additional combinations that work effectively within the facility and are acceptable to the FAA principal inspector (PI) may be included in the manual system.

1-5. SAMPLE PROCEDURE FORMATS. The following samples are provided to help the manual writer determine a possible format for the procedures in the manual system. These are only four examples of many possible formats. Part 145 sets the requirements for content, not format. The format used for the procedures in the manual should fit the size and complexity of the facility. If there are existing procedure manuals in the facility, the manual writer may wish to include the same format in the RSM(s). If facility employees are accustomed to a particular format, the manual writer should continue to use that format.

SAMPLE PROCEDURE FORMAT 1

John Smith Component Repair, Inc.
123 Any Street
Somewhere, CT 12345

Section: 5
Page: 3
Revision: 1
Date: 11/14/2001

PRELIMINARY INSPECTION

The Chief Inspector (**WHO**) of the repair station is responsible for the performance of appropriate inspections, including functional and nondestructive tests. This inspection will be conducted on the hangar floor or in the inspection area (**WHERE**) for components. This will ensure that all units (**WHAT**) delivered to the repair station for maintenance are inspected to determine the state of preservation and any defects. This inspection will be recorded on the Preliminary Inspection Form 567 (**RECORD**) with any discrepancies noted. The form must be attached to the work order and will remain with the applicable inspection records until the unit is released for service. Forms 123 and 789 will be used to record the results of the functional and nondestructive tests. Those forms will show the work order number and will be routed, attached to the work package.

HOW

a. **Format Discussion.**

(1) Advantages. Format 1 includes each of the required elements of a procedure in a narrative format. This format is easy to write, as long as the author remembers to include all of the elements. This format is usually easy for the reader to understand and requires no special training for the author or reader.

(2) Disadvantages. The narrative can easily become too complex or wordy. The author may fail to include all of the required elements of the procedure. The narrative must be presented in a logical sequence so the reader can easily understand the flow of the procedure.

SAMPLE PROCEDURE FORMAT 2

THE JOHN SMITH COMPANY OPERATING PROCEDURE 123

Title: Receiving Inspection Page 1 of 4

Revision: A Issue Date: November 12, 2001

Reason: To ensure consistent quality of incoming raw material.

Scope: Applies to all raw material shipments received. This procedure does not apply to incoming parts received for repair.

Responsibility: The receiving inspector is responsible for inspecting all incoming raw materials.

Procedure:

1. The receiving inspector will visually inspect the container (if used) and/or material for any shipping or handling damage.
2. The receiving inspector will immediately report any shipping or handling damage to the purchasing department.
3. Compare the purchase order (copy located in receiving file) with the shipping document to ensure the material is correct.
4. Etc.

b. Format Discussion. Format 2 assigns responsibility as part of each procedure. The narrative should be written in a format easily understood by the person who uses and must follow the procedure. Note that the format also includes revision status, issue date, and page numbering. The reason and scope may be used to state the company policy or objective.

SAMPLE PROCEDURE FORMAT 3

John Smith Overhaul & Repair			
Quality Procedure—Control of Inspection, Measuring, and Test Equipment			
QP 4.11			
Approval	Approval	Revision/Date	Reason for Change
John Smith, Sr.	Jane Doe	Original—04/01/2000	Original issue
John Smith, Sr.	Jane Doe	A—06/15/2000	Added gage request form

- 1.0 Purpose: To ensure that all precision tools and equipment are properly calibrated, identified, and maintained.
- 2.0 Scope: This procedure applies to all employees who use inspecting, measuring, and testing equipment, and those who calibrate that equipment.
- 3.0 Responsibility: The Director of Quality is responsible for ensuring that all inspecting, measuring, and testing equipment is calibrated and traceable. Only trained and qualified personnel are permitted to adjust and calibrate equipment.
- 4.0 Reference Documents:
- 4.1 QAP 15.0, Inspection and Test Status
 - 4.2 MIL-STD-120 Gage Inspection
 - 4.3 Work Instruction (WI) 4.11-1 through WI 4.11-20
- 5.0 Definitions:
- 5.1 Accuracy of Measurement: The closeness of the agreement between the result of a measurement and the conventional true value of the measurement.
 - 5.2 Uncertainty of Measurement: The result of the evaluation aimed at characterizing the range within the true value of a measurement. It's estimated to lie generally within a given likelihood.
 - 5.3 Etc.
 - 5.4 Etc.
- 6.0 Procedure:
- 6.1 The gage calibration technician will maintain a computerized list of all precision tools and equipment using the Gage Control software program.
 - 6.2 During the first week of the month, the gage technician should run the "Calibration Required" report, listing all tools and equipment that must be calibrated before the end of the month.
 - 6.3 The gage calibration technician will issue a John Smith Recall Slip (Form 789) to the department or individual. This form states which tools are due for calibration and the date they must be returned to the tool crib.
 - 6.4 Etc.
- 7.0 Records:
- 7.1 Form 789, Recall Slip
 - 7.2 Form 456, Record of Calibration
 - 7.3 Form 123, Identification Sticker
 - 7.4 Etc.

c. Format Discussion. Format 3 is often used for procedures included in an ISO 9000 quality system document. Note that space is provided to document approval and release of the document (part of a document control system). Terms used within the procedure are defined. Additional documents associated with this procedure are listed. The format is structured—perhaps too structured—for some organizations. The procedure follows a standard numbering system for each portion of the procedure, allowing for precise reference for paragraphs that may be discussed or revised. Work instructions and records may follow the same numbering convention (i.e., QP 4.12, WI 4.12-1, and Form 4.12-A). Forms may be included within the procedure or in a separate forms section of the manual system.

d. Sample Procedure Format 4 Introduction.

(1) The following flowchart illustrates another possible method of presenting a procedure. Although the sample illustrates a simple procedure, complex processes could be presented using a flowchart. The person using the manual would need to be familiar and comfortable with flowcharts and flowchart symbols.

(2) The flowchart process may also be used to develop a procedure that was not previously documented. The procedure could be initially drawn on paper using a flowchart, and then described using the narrative format in the manual. This process works well when the users of the manual are more comfortable with narrative procedures rather than flowcharts.

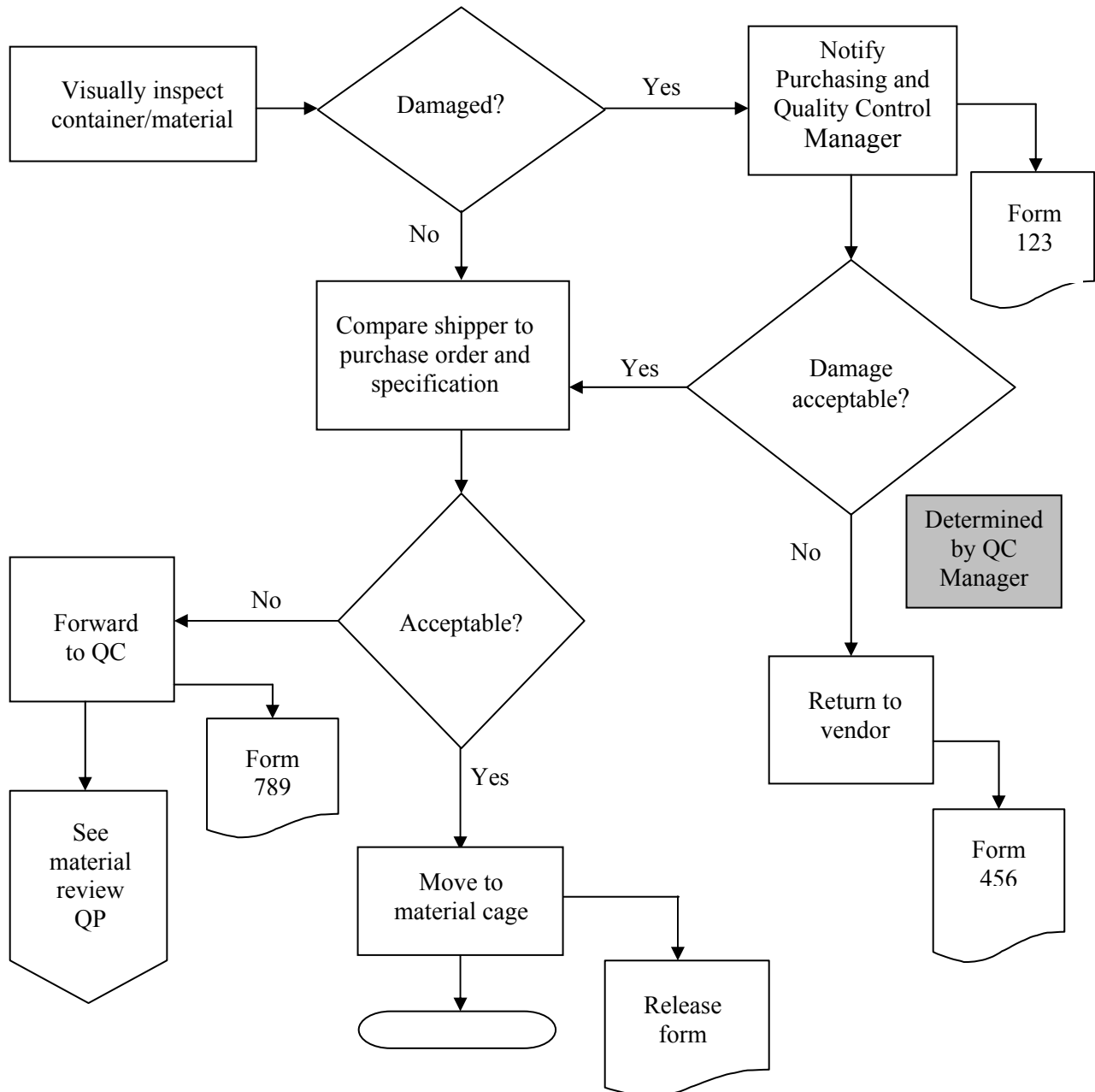
(3) Another possible use of the flowchart is to verify if a narrative procedure will work. This process is essentially the opposite of the process previously described. While reading the narrative of the procedure, a flowchart is created to visually represent the various steps. A review of the completed flowchart will show any redundant or missing steps.

(4) A flowchart can also be used during a process audit. The auditor creates a flowchart while reviewing the performance of a particular process. The auditor then compares the process he or she observed with the process described in the manual. Any differences may be noted in the auditor's report.

e. Format Discussion. Format 4 requires the reader to have some familiarity with flow charts, but can be easily understood by someone who understands the format. Because the flow charts contain fewer words than other formats, the process can be read and understood quickly. This format takes longer to develop unless the author has specific software for the purpose.

SAMPLE PROCEDURE FORMAT 4 (Continued)

Section: 5
Page: 3
Revision: 1
Date: 11/14/2001



CHAPTER 2. MANUAL REVISION AND CONTROL

2-1. PROCEDURES FOR REVISION.

a. References:

- Section 145.207(e),
- Section 145.209(j),
- Section 145.209(k),
- Section 145.211(c)(4), and
- Section 145.211(d).

b. Requirements. The RSM and the QCM must contain procedures for revising the manual(s) and notifying the CHDO of revisions.

NOTE: The regulations do not require FAA review and acceptance of revisions before implementation, provided the repair station follows the revision procedures in its manual. The repair station should have a procedure in its manual to recall revisions if the FAA finds a revision unacceptable.

c. Control Submissions and Revisions. This section of the manual must contain procedures to control the original submission of the manual and subsequent revisions. The procedures should ensure that persons issued a manual receive revisions. Repair station employees may require training on the content of the revisions, especially if a standard operating procedure or inspection procedure is changed.

d. Describe Control System. The manual must include a description of the system used to identify and control sections of the manual. The format and structure of this system is not specified by the regulation. This flexibility will accommodate the technological changes that permit repair stations to maintain and revise the manuals in different formats and manners.

e. Procedures. Regardless of the media used for the manual, the procedures for making revisions should include:

(1) Who, by title, is responsible for making revisions?

(2) Who will submit revisions to the FAA for review and acceptance?

(3) How will the repair station incorporate changes to revisions found not acceptable to the FAA, which do not conform to applicable regulations?

(4) How will the repair station correct any maintenance/administrative actions performed under revisions that were found not acceptable to the FAA?

(5) How will the revisions be distributed and made available within electronic systems, and how will the FAA receive its revisions?

(6) Accountability—how will the facility ensure that each manual holder or designated location receives each revision?

(7) Identification of each revision to the text on each affected page. For example, a vertical bar in the margin or other suitable method may indicate the revised portion of text.

2-2. PROVISIONS FOR CONTROL. If the manual is in paper format, the revision and control part of the manual should contain the following (or equivalent) information:

a. Revisions. Procedures for revising the RSM and notifying its CHDO of revisions, including how the FAA will be notified of revisions.

b. Details. Provisions for selecting the revision number, the date of the revision, the pages revised, and a place for the person making the revisions to the assigned manual to sign or initial.

c. Manual Control Number and Assignment. Each manual should have a unique number assigned to it and the name of the individual, department, or group assigned to that particular manual. The manual procedure should identify who will maintain a master distribution list that contains the manual number, assigned individual, and revision status.

NOTE: An acknowledgement form is a common method of tracking the receipt and insertion of the revision by the manual holder, which ensures accountability. With this method, after receiving a revision, each manual holder inserts the revised pages into the manual, records incorporation of the revision in the record of revisions, and returns the signed acknowledgement form to the person responsible for manual control.

2-3. ELECTRONIC FORMAT. The manual(s) may be maintained on a computer network or other electronic medium. AC 120-78, Acceptance and Use of Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manuals, provides additional guidance for electronic systems.

a. Network. If the manual is maintained on a network server, the following concerns must be addressed in the procedures:

(1) Security—How will the repair station ensure that only authorized personnel make any changes? Who (by title) will be authorized to make those changes and how is that person authorized?

(2) Access—Have the employees been trained to access the manual on the network? Is access protected by passwords? Do all of the supervisors and inspectors have access to the manual?

(3) Revisions—How will the user know that the manual has been revised, and the content of that revision?

(4) Availability—How will the repair station ensure that the current manual(s) are available for all shifts?

b. Disk. If the manual is maintained on a disk, the following concerns must be addressed in the procedures:

(1) How will the manual and any subsequent revisions be distributed? How will receipt of the revision be documented?

(2) Is the software used for writing the manual compatible with the software used by all manual holders, including the FAA?

(3) Are all of the manual holders trained on the procedures necessary to access the manual at their workstations?

(4) How can station personnel verify if the disks are current before they use them?

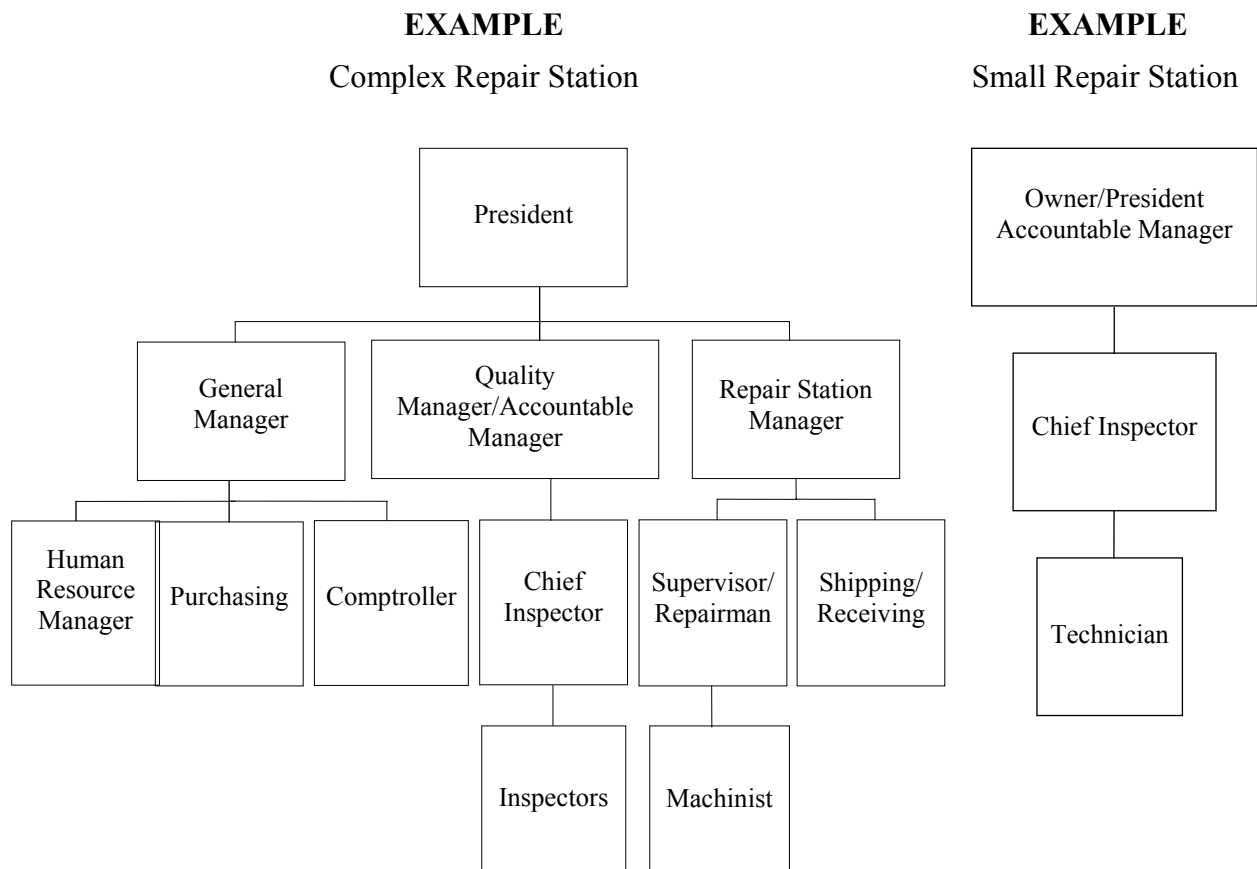
NOTE: Federal law prohibits agencies from making the use of electronic media more difficult or from requiring additional steps or procedures for users of electronic media. Therefore, all repair station document submissions, regardless of the media used, must be accompanied by a cover letter that describes the submission and is signed by an appropriate manager. FAA inspectors will either accept or reject the manual revision. The FAA inspector will, by letter, inform the repair station of acceptance or rejection. The letter will address the manual title, manual date, and revision number. If the manual is rejected, the FAA inspector will provide a detailed explanation of the deficiencies and advise the repair station not to perform maintenance if the rejected manual procedures are in use.

CHAPTER 3. REPAIR STATION ORGANIZATION CHART

3-1. ORGANIZATION CHART.

a. **Reference.** Section 145.209(a).

b. **Authority.** The organization chart identifies (by title only) each management position with authority to act on behalf of the repair station. If the repair station performs work for air carriers or air operators under part 145, § 145.205, and is performing RII, the FAA suggests that the chart reflect the separation between the maintenance and inspection departments.



c. **Procedure Details.** Ensure that the following concerns are addressed in the manual procedures.

(1) Are the titles and reporting structure for the organization chart appropriate for the facility?

(2) Are the titles for the positions the same throughout the manual?

(3) Is each management position with authority to act on behalf of the repair station identified?

(4) Is an accountable manager designated?

3-2. DUTIES AND RESPONSIBILITIES.

a. Organization. This section may be combined with the organization chart as one section/chapter of a manual system. If the repair station documents its procedures in a format that includes a Responsibility section in each procedure, it will not need to have a separate Duties and Responsibilities section (see Chapter 1, Sample Procedure Formats 2 and 3).

b. Area of Responsibility. This section includes the area of responsibility assigned to each management position and the duties, responsibilities, and authority of each management position. The repair station must ensure that the duties and responsibilities are appropriate and that the positions exist within the company. Although not required by the regulation, many repair stations choose to include duties and responsibilities beyond the required management personnel. Positions described in the organizational chart should be included in the duties and responsibilities section to ensure consistency.

c. Additional Responsibilities. Duties and responsibilities that are outside the scope of the management, but are part of the regulatory requirements, should be described in this section of the manual. For example, equipment maintenance, approval for return to service, applications for repairmen, and so forth.

NOTE: Only titles, not names, should appear in this section. Titles should be the same as on the organization chart and elsewhere in the manual.

NOTE: Titles used in the following format samples are only examples.

SAMPLE: NARRATIVE FORMAT.

Owner/President: The Owner/President is responsible for the overall operation of (name of the repair station) in accordance with the applicable CFRs. The Owner/President's duties include maintaining an adequate and knowledgeable staff to plan, perform, supervise, and inspect the work being performed on civil aviation articles. The Owner/President may delegate all duties to the qualified persons as necessary. However, such delegation does not relieve the Owner/President of the overall responsibility.

SAMPLE: OUTLINE/LIST FORMAT.

Quality Manager: The Quality Manager reports to the President and is responsible for managing the repair station quality control system. The duties of the Quality Manager include:

- (1) Supervising all inspection personnel.
- (2) Maintaining a current file of pertinent technical data, including CFRs, specifications, manufacturer's maintenance manuals, service bulletins (SB), Airworthiness Directives (AD), and other data acceptable to or approved by the FAA.
- (3) Ensuring the proper execution of FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance), when required.
- (4) Etc.

SAMPLE: ISO/INDUSTRY FORMAT.

The duties and responsibilities may be addressed in the management responsibility section of the manual (i.e., section 4.1).

a. The following questions or concerns are offered as a guide and are intended to help the facility initiate the procedures in its RSM. They should not be considered all-inclusive. Each facility is unique and therefore may require additional procedures to verify regulatory requirements and the needs of the repair station.

- (1) Do the duties and responsibilities include the areas of responsibility assigned to each management position?
- (2) Do the duties and responsibilities indicate the reporting structure (to what other position does each report)?
- (3) Does the narrative describe the job function(s) that person performs (i.e., calibration, training, personnel management)?
- (4) Do the procedures ensure that the duties and responsibilities of supervisory and inspection personnel are performed in their absence?
- (5) Does the manual have a procedure to determine if a supervisor or inspector is qualified for any delegated duties?

b. Consider the following when assigning duties and responsibilities within the repair station:

- (1) Is each supervisor certificated?
- (2) Do the inspectors understand, read, and write English?
- (3) Are persons with approval for return to service authority certificated?

CHAPTER 4. REPAIR STATION AND QUALITY CONTROL MANUAL ELEMENTS

4-1. REPAIR STATION PERSONNEL ROSTER.

a. References:

- Section 145.161, and
- Section 145.209(b).

b. Authorized Personnel. Personnel rosters are lists of individuals within the repair station who are authorized to perform certain functions, such as approval for return to service or signing off required inspection items, or that hold certain management and supervisory positions. These lists can be maintained in paper or electronic format, but must be accessible for review and inspection by the FAA.

c. Roster Format. The repair station must maintain a personnel roster or rosters that list managers, supervisors, inspectors, including RII inspectors, and those individuals authorized to approve an article for return to service. Each repair station may develop its own roster format, as long as it contains all of the appropriate names.

d. Manual Inclusion. The rosters do not need to be included in the manual, but the procedures for maintaining and revising the rosters must be in the manual. If the rosters are not included in the manual, the procedure should describe where the rosters would be located. The procedure must describe how the roster will be changed within 5 business days of the termination, reassignment, change in duties or scope of assignment, or addition of any personnel.

e. Combination Roster. It may be appropriate for the repair station to develop a combination roster, which would include initials, signatures, stamp numbers, certificate numbers, or any other information used to designate the authority of inspection or supervisory personnel who can sign/stamp off work documents or approve articles for return to service.

f. Employment Summaries. The repair station must also maintain employment summaries for each person whose name appears on the rosters. Employment summaries of supervisors, inspectors, and persons responsible for return to service may be in the national language for repair stations located outside the United States. Such repair stations should describe in their manuals how they would provide the FAA with an English version of employee summaries. The requirements for content of the employment summaries are found in § 145.161(a)(4).

g. Roster Procedures. The following questions should be answered during development of the procedures concerning the rosters:

(1) Who is responsible (by title) for maintaining the rosters in current condition? Has an alternate been designated?

(2) Where will the rosters be located?

(3) How will the rosters be revised within 5 business days?

(4) Is authority to approve an article for return to service shown on the rosters? Who is responsible for designating those individuals, and how are those individuals designated?

(5) Are the managers, supervisors, inspectors, and persons authorized to approve articles for return to service all listed on the rosters?




(6) Are the supervisors certificated, and with what type of certificate if located outside the United States?

(7) Are the persons authorized to approve articles for return to service certificated? (Each person authorized to approve articles for return to service must be certificated under part 65, unless located outside the United States.)

(8) Are there employment summaries for each person on the roster?

h. Examples. The following are examples of possible roster formats.

EXAMPLE 1

Name and Title	Certificate Type and Number	Signature and Initials	Stamp	Authorization
John Smith Chief Inspector	A&P 12345678	<i>JOHN S.M.I.H., J.P.</i>		A, B, C
Jane Doe Receiving Inspector	Repairman 789654321	<i>Jane Doe, J.D.</i>		B
David Goodeye Final Inspector	Repairman 456789123	<i>David Goodeye, D.G.</i>		A, C
Etc.				

Explanation of Authorization:

A—Authorized to approve articles for return to service

B—Authorized to sign for a specific inspection

C—Authorized to sign for in-process and final inspection

EXAMPLE 2

Section: III Date Completed: 11/13/2001 Revision No. 1
Personnel
Title: Chief Inspector/Repairman
Authorized Signature: <i>Kyle R. Bowman</i>
FAA Airman Certificate Held: Repairman No. 123456789
Authorized to Sign: Log books and other approvals for return to service, Malfunction and Defect Reports

EXAMPLE 3

John Smith Component Repair, Inc.			
			Effective Date: 11/13/2001
Supervisory and Inspection Personnel Roster			
TITLE	NAME	CERT. TYPE & NO.	AUTHORITY
CEO	John Smith	N/A	N/A
Q.C. Manager	Jane Smith	Repairman 1234567	FPI, Machining
Foreman	Dan Jones	Repairman 98765432	Machining, Cleaning
Chief Inspector	David Jones	N/A	N/A

4-2. OPERATIONS, HOUSING, FACILITIES, EQUIPMENT, AND MATERIALS.**a. References:**

- Part 43, and
- Sections 145.101 through 145.109.

b. Operations. This section of the manual should include a general description of the repair station operations. The manual should describe how the repair station operates, from receiving an article for maintenance to approval for return to service. The description could be in a narrative, flowchart, or other format. Any/all standard operating procedures developed for the facility could be included, such as contract/purchase order review, human resources, equipment and facilities maintenance, technical data, document control, and so forth.

c. Housing and Facilities. This section should include a description of the housing and facilities, and a drawing showing the floor plan of the facility. The drawing could include the entrance(s), parking areas, and street locations. The drawing and description may include the type of heating, lighting, equipment location, shop areas, electrical, and compressed air outlets.

A description of any facilities used for spray painting, avionics, engine or airframe repair, or any other work that would have special requirements should be included.

d. Equipment and Materials.

(1) The repair station must have the equipment, tools, and materials necessary to perform the maintenance in accordance with part 43. The equipment, tools, and materials must be located on the premises and under the repair station's control when the work is being done. Some of this equipment may be very expensive and the repair station may rarely use it. If the repair station does not own the equipment and it is not kept at the facility, the manual must describe how the equipment is obtained (i.e., lease, rental, etc.). The manual should also describe the procedure for ensuring the equipment is on the premises and under the repair station's control at the time the work is being performed.

(2) This section of the manual should also describe where the equipment is likely to be used and how the repair station will comply with special handling requirements for sensitive tools and equipment. Some test benches and special equipment may require calibration/verification after relocation. This section of the manual should describe how the repair station ensures that required calibration/verification is performed before using the equipment to perform maintenance or alteration on civil aviation articles. The RSM should identify which department is responsible for calibrating leased tools and equipment.

(3) The RSM must include a description of the equipment used to perform maintenance. For example, if the facility includes a machining area, then a generic description of the types of machines located in that area should be included in the manual. The description should not be so specific that updating equipment would result in a manual revision. The equipment, tools, and materials must be those recommended by the manufacturer of the article or must be at least equivalent to those recommended by the manufacturer and accepted by the FAA. The repair station may refer to a list of equipment maintained for other purposes, such as a list kept by the accounting department for tax purposes. The list must be available for review by the FAA. The list need not include the cost of the equipment or any other financial or business information.

e. Equivalent Tools and Equipment.

NOTE: This section is not intended to discuss industry standard tools and equipment (i.e., wrenches, multimeters, sockets, etc.) that are manufactured to a recognized industry standard.

(1) If the repair station will be using equipment, tools, or materials other than those recommended by the manufacturer, the manual must explain the procedure it will use for determining equivalency of equipment, tools, and materials. To determine equivalency, compare the technical requirements of the special equipment or test apparatus recommended by the manufacturer with the proposed replacements. The equipment or test apparatus may look different, be made of different materials, be a different color, and so forth. However, the equipment or test apparatus must be capable of performing all necessary tests and checking all required parameters of the articles. The level of accuracy should be equal to or better than that

recommended by the manufacturer of the equipment/tools. Reverse engineering must include the data, drawings, testing, or reports necessary to determine that the article is equivalent to the article recommended by the manufacturer. The basis of equivalency is the requirement that the article meet the manufacturer's standards and specifications in all respects regarding tolerances, repeatability, and accuracy. Repair stations should review the specific requirements of part 43 before developing equivalent tools and equipment.

(2) Standard industry practice establishes that each piece of special equipment or test apparatus have a unique part number and serial number to identify it within the repair station's inventory system. Whether the equipment or apparatus is obtained from the manufacturer or produced by the repair station, it should be identified in the system for calibration and tracking purposes.

(3) The following questions or concerns are offered as a guide and are intended to help initiate the procedures for describing the housing, facilities, and equipment in the manual(s). They should not be considered all-inclusive. Each facility is unique and therefore may require additional procedures to verify regulatory requirements and needs of the repair station.

(a) Does the manual include a description of how the repair station operates?

(b) Does the manual include a drawing of the housing, identifying the various work facilities within the building(s) and giving a narrative description of the construction of the housing and facilities?

(c) Does the description and/or layout identify areas with special requirements?

(d) Does the description include a generic overview of the equipment?

(e) When leasing or renting equipment, does the manual contain procedures describing the lease/rent process and who is responsible for managing the program, including the required calibration/verifications?

(f) How does the repair station ensure that the equipment is in place and under the facility's control when the work is performed?

(g) If the repair station is using special equipment or tools other than those recommended by the manufacturer, does the manual include procedures for determining equivalency?

(h) Does the manual include a description of the stock room/area, how inventory is requisitioned for particular jobs, and how shelf life inventory is maintained?

4-3. CAPABILITY LIST.

a. References:

- Section 145.209(d), and

- Section 145.215.

b. Capability List. A certificated repair station with a limited rating may perform maintenance, preventive maintenance, or alterations on an article if it is listed on a current capability list acceptable to the FAA or on the repair station's OpSpecs. If the repair station chooses to use a capability list, the RSM must:

- (1) Contain procedures for revising the list and notifying the CHDO;
- (2) Include how often the CHDO will be notified of revisions;
- (3) Contain the procedures for the self-evaluation required under § 145.215(c) for revising the capability list;
- (4) Describe the methods and frequency of such evaluations; and
- (5) Contain the procedures for reporting the results to the appropriate manager for review and action.

c. Revising the List. The capability list itself may be included as a part of the RSM or as a separate document; however, the procedures for revising the list and for performing the self-evaluation must be in the manual.

d. Self-Evaluation.

(1) The individual performing the self-evaluation required under § 145.215(c) should have the following qualifications:

(a) Experience with performing evaluations (or audits if that is the method selected by the repair station).

(b) An understanding of the requirements of part 145.

(c) Knowledge of the maintenance requirements for the particular make/model of article to be added to the list.

(2) The individual should follow the procedures in the RSM, using the checklists, working documents, and forms to record the self-evaluation. The checklists and forms may need to be customized for each self-evaluation. The self-evaluation should ensure that the repair station has the following:

(a) The appropriate limited rating.

(b) Adequate housing and facilities.

(c) Recommended tools, equipment, and materials, or equivalent.

(d) Current technical data.

(e) Sufficient qualified personnel.

e. Record and Report the Results. The individual conducting the self-evaluation must record the results and report them to the appropriate manager or management team for review and approval. The procedures should describe the acceptance process for the company officials and the FAA. The procedure used to revise the list should describe the method used to indicate any changes made to the list. Any deficiencies found during the self-evaluation must be corrected before the article can be added to the capability list. When the self-evaluation establishes satisfactory results, the capability list may be revised. The repair station should keep records of the self-evaluation on file for the period specified in the manual. For repair stations located outside the United States, the records of the self-evaluation may be in the national language, however, they must be made available to the FAA in English.

f. Person Responsible for Maintaining the List. The procedures for revising the list and notifying the CHDO should include the title of the person responsible for maintaining the list and communicating any revisions to the CHDO. If the self-evaluation was satisfactory, the capability list may be revised. The revised list and any other necessary technical data can be submitted with a cover letter to the PI at the CHDO within 5 business days. The PI will review the revisions and, if the revisions are satisfactory, signify acceptance by signing and dating the appropriate document.

g. List Currency. Capability list currency can be shown by a list of effective pages or equivalent document, which is signed by the authorized representative of the repair station and the FAA PI.

h. Deleting Articles. If the repair station no longer wishes to maintain an article on its capability list, the article should be deleted. The repair station must have the necessary tools, equipment, housing, facilities, and trained personnel to maintain articles on the capability list at the time the work is performed. The procedures in the manual should describe how to delete articles from the list and how to forward the revised list to the FAA for acceptance. The repair station may choose to audit the capability list on a regular basis to ensure that it continues to have the housing, facilities, equipment, and technical data that meet all necessary requirements to maintain the articles listed in the document. Whenever equipment, tooling, personnel, and data must be obtained in order to perform the maintenance or alteration on an article that is going to be added to the capabilities list, the repair station must explain how it will ensure these items will be available when the work is being performed.

i. Electronic Media. If the capability list is maintained on electronic media, the repair station will need to work with the CHDO to ensure compatibility of the media, equipment, and software with that of the CHDO. Revision procedures will need to address documentation of approval by the company as well as acceptance by the FAA.

j. Procedures Guide. The following questions or concerns are offered as a guide and are intended to help initiate the procedures in the manual. They should not be considered all-encompassing. Each facility is unique and therefore may require additional procedures to verify regulatory requirements and the needs of the repair station.

- (1) What is the title of the person who will maintain the capability list?
- (2) How will the self-evaluation be performed?
- (3) Who will perform the self-evaluation?
- (4) How will the self-evaluation be documented?
- (5) How will results of the self-evaluation be reported to management and how will management review the addition of capabilities to the list?
- (6) How will items be added to and deleted from the list?
- (7) How are changes clearly indicated on the document?
- (8) If electronic media is used, is the hardware and software compatible with that of the CHDO?
- (9) Where and by whom will self-evaluation reports be maintained?
- (10) How long are self-evaluation reports maintained?

4-4. TRAINING PROGRAM REVISION.

a. References:

- Section 145.163, and
- Section 145.209(e).

b. Chapter Information. Repair stations developing a training program may use the information in this chapter as a reference. AC 145-10, Repair Station Training Program, provides additional information on developing the repair station employee training program required under § 145.163.

c. Required Procedures. The RSM must include procedures required by § 145.163 for revising the training program. It must also include procedures for submitting those revisions to the CHDO for approval.

NOTE: Repair stations located outside the United States should submit the repair station training program in the English language.

d. Responsibility for Revisions. The procedures should address who will be responsible for ensuring that revisions are submitted to the PI at the CHDO for review and approval. The procedures should include instructions for approval by the repair station before submission to the FAA, as well as provisions for the FAA PI's approval of the program and its revisions.

e. Frequency of Review. The procedures should address how often the program will be reviewed to determine if it is current and adequate for the type of maintenance being performed

at the facility. Because the advancements in technology can cause aviation maintenance to change rapidly, a periodic review of training needs would be appropriate. Repair stations that have established a management review program should include the training program for review during that meeting.

f. Training Program. The training program may be documented as a section of the RSM, or as a separate document within the manual system. If the training program is a separate document, that document will need to include the procedures for submission to and approval by the FAA.

g. Training Program Guide. The following questions or concerns are offered as a guide and are intended to help the repair station initiate the procedures in its manual(s). They should not be considered all-inclusive. Each facility is unique and may require additional procedures to verify regulatory requirements and the needs of the repair station.

- (1) Who is responsible for submitting the initial training program and its revisions to the FAA?
- (2) When will the revision be submitted?
- (3) How will the revision be approved (include the company approval as well as FAA)?
- (4) How often will the training program be reviewed for currency and completeness?
- (5) Who will perform the review?
- (6) How will revisions be recorded and implemented?
- (7) How will the revised text be identified?

4-5. WORK PERFORMED AT ANOTHER LOCATION.

a. Reference. Section 145.203.

b. Special Circumstances. The rule permits a repair station to perform work away from its fixed location on a temporary basis. When a special circumstance arises, or it is necessary to perform such work on a recurring basis. Section 145.203(a) permits temporarily working away from the repair station's fixed location due to a special circumstance, as determined by the FAA. Examples would be an aircraft on the ground or in preparation for a ferry flight. Normally work performed at another location does not include working outside the country where the repair station is located. However, work performed outside the country under a special circumstance may be authorized under § 145.203(a). If work must be performed outside the country, the repair station should obtain required approvals from the country where the work will be performed. The RSM will need to include a procedure on notifying the local CHDO when these special circumstances arise in order to obtain the FAA's approval in each instance. A manual procedure for the work performed will not be necessary. The RSM procedures should address the following:

(1) The method used for identifying the customer and describing the work requested or anticipated, the location at which the work will be performed, the type of material, equipment, and personnel that will be required to perform the anticipated work, the way the material, equipment, and personnel will be transported, and the precautions that will be taken to ensure that the material and equipment are adequate for the work that actually needs to be performed.

(2) The title of the person who will notify the CHDO.

(3) How the notification will be made.

(4) How the approval/denial will be recorded and stored.

c. Recurring Work. Section 145.203(b) permits work away from a repair station's fixed location when it is necessary to perform such work on a recurring basis, such as a repair station that performs fuel tank maintenance and the work can only be performed on the aircraft away from the repair station's fixed base, or the installation of aircraft seats after refurbishment. These are examples only; other repair stations may have their own unique circumstances that require performing maintenance away from their fixed base. A manual procedure for work performed is required if the repair station performs work at another location on a recurring basis. The RSM must include procedures for accomplishing maintenance, preventive maintenance, alterations, or specialized services at a place other than the repair station's fixed location. This business practice will provide flexibility and mobility to meet industry needs and not be restricted "only" to special circumstances. The manual procedures should address the following:

(1) Describe the preparations and conditions to be met before performing any work away from the repair station.

(2) Who is responsible for supervising the maintenance performed at another location?

(3) Are the appropriate sections of the RSM available at the remote site?

(4) How does the facility ensure that adequate housing, facilities, tools, equipment, personnel, and current technical data are available at the site? If materials, tools, and equipment must be transported, how will their calibration be ensured?

(5) Does an individual certificated under part 65 supervise the work of persons unfamiliar with the work to be performed?

(6) When and how is the article inspected? Is the inspector qualified and authorized (on the roster)?

(7) How is the work recorded? Do the records meet the requirements of part 43, § 43.9?

(8) Are the forms at the repair station the same as those used at the other location?

(9) Who is responsible for transporting and storing the records? Where will they be stored?

(10) How does the facility ensure that each location stays in compliance with its manual and part 145?

NOTE 1: The rule does not allow continuous, uninterrupted operations at another location without applying for a repair station or satellite certificate at that location.

NOTE 2: A combination of storing equipment, tools, parts, etc., and having repair station personnel permanently positioned at a site and performing maintenance on a daily basis away from its permanent fixed base indicates a continuous, uninterrupted operation. A repair station that operates in this fashion no longer meets the intent of § 145.203. If the repair station is to continue its operations in this manner, then it must apply for certification as a satellite or stand-alone repair station.

d. Permanent Fixed Location. Additionally, work that is to be performed at another location does not include other authorizations, such as having a line maintenance authorization to perform work for an air carrier. Work performed at locations away from their fixed base allows repair stations the flexibility to meet industry needs and to be mobile when necessary. Repair stations must still maintain a permanent fixed location even if the majority of their work is done at another facility.

4-6. MAINTENANCE, PREVENTIVE MAINTENANCE, AND ALTERATIONS PERFORMED FOR AIR CARRIERS UNDER PARTS 121, 125, 129, AND 135.

a. Reference. Section 145.205.

b. Requirements. Some repair stations perform maintenance, preventive maintenance, or alterations for air carriers conducting operations under parts 121, 125, 129, and 135. In this case, this section of the manual must describe the procedures to ensure that maintenance is performed in accordance with the air carrier's program and maintenance manual. These procedures must ensure that the air carrier has provided the repair station with the information necessary to ensure compliance with this requirement. The air carrier may provide the repair station with the applicable sections of its maintenance program or manuals at the time the work is performed. On the other hand, the purchase order or other contractual documents from the air carrier could clearly state the source of the data (manufacturer's or air carrier's manual) used to perform the requested maintenance along with any other requirements of its program or maintenance manual. If the repair station performs an inspection for a certificate holder conducting operations under part 125, the manual must contain procedures to ensure the inspections are performed in accordance with the operator's approved inspection program. Again, the operator may provide the repair station with the applicable sections of its inspection program or clearly outline the requirements on the purchase order.

c. Identify Responsibilities. The procedures should identify who is responsible (by title) for keeping all of the operators' data current, and where these manuals/sections will be located if retained at the repair station. The procedures also must explain what air carrier or commercial operator information must be available to maintenance personnel when the work is performed.

Additional procedures will be required to ensure that purchase orders are thoroughly reviewed. This review will be necessary to ensure that the air carrier has clearly specified what technical data to use for performing the maintenance. Employees may need additional training to properly perform this review. The traveler or work-order system of the repair station may be used to integrate this information into the quality control system. If the repair station transfers requirements from the air carrier or commercial operator to its maintenance personnel by special instructions on the work order or traveler, that section of the quality control system must clearly explain how this is accomplished.

d. Organization. The repair station performing maintenance for an air carrier must have an organization adequate to perform the work. This includes the ability to distinguish the work performed for different operators. Additionally, if the repair station is performing RII inspections the organizational structure must provide separation of maintenance and inspection personnel. The air carrier, not the repair station, determines the maintenance actions that are RII. If the repair station's inspectors are authorized to perform RII for the air carrier, the air carrier must ensure that the inspectors are trained on the carrier's RII procedures, including how the inspection is performed and recorded.

(1) The inspectors performing RII for the carrier must be qualified and authorized by the carrier. This authorization is usually in written format, often a card carried by the inspector. The authorization may need to be renewed, depending on the air carrier's procedures. The procedures in the RSM should include who will maintain a list of current RII inspectors, how an inspector is added to the list, and where the list is located.

(2) The repair station should request information from the air carrier or commercial operator pertaining to at least the following issues:

(a) RII.

(b) Training requirements for the work being performed on the operator's behalf, including who will provide the training.

(c) Maintenance duty time requirements.

(d) Special maintenance or alteration instructions per engineering orders, build lists, and other methods, techniques, and practices in the operator's manual per part 43, § 43.13(c).

(e) Recordkeeping requirements, including who is responsible for maintaining the files.

e. Line Maintenance Authorization. The FAA may authorize a certificated repair station to perform line maintenance for an air carrier conducting operations under parts 121, 129, and 135, provided that:

(1) The repair station performs the maintenance in accordance with the operator's manual, if applicable, and approved maintenance program.

(2) The repair station has the necessary equipment, trained personnel, and technical data to perform the line maintenance.

(3) The repair station's OpSpecs include an authorization to perform line maintenance.

f. Line Maintenance Requirements. If the repair station is going to perform line maintenance, its manual must include procedures to ensure that the necessary equipment, technical data, and trained personnel are available before the maintenance can be performed. This should include who, by title, will be responsible for ensuring that the necessary equipment, technical data, and trained personnel will be available when the work is being performed.

g. Coordination with the Air Carrier. The repair station's training program can be conducted in coordination with the air carrier. The specific training an employee receives should be recorded in the employee's training record. The procedure will need to include who, by title, is responsible to ensure that training is conducted and recorded. The repair station should maintain a list of individuals who are trained by the air carrier to perform line maintenance. Although air carrier maintenance requirements may be incorporated into the repair station's training program, the repair station must follow its training program requirements with respect to conducting the training, recording the training in employee training records, and qualifying those individuals authorized to perform line maintenance for an air carrier. Air carrier training does not relieve the repair station from the requirement to ensure its personnel are trained for the maintenance it is rated to perform.

h. Initiate Development. Addressing the following concerns (if applicable) will initiate development of the procedures for performing maintenance for an air carrier:

(1) Who is responsible (by title) for keeping a file of the air carrier's procedures, including the necessary technical data?

(2) Who is responsible (by title) for review and amendment of purchase orders for complete and correct instructions? Is that person trained?

(3) Who will maintain the list of current RII inspectors?

(4) Does the RSM include procedures to ensure that the necessary equipment, trained personnel, and technical data will be available for line maintenance?

(5) Who is responsible for coordinating the training program with the air carrier?

(6) Does the repair station roster include authorization for individuals performing line maintenance and RII?

(7) How does the repair station ensure that personnel comply with its manual and appropriate sections of the air carrier's manual—regardless of location?

NOTE: The authorization to perform line station maintenance for an air carrier is not a rating. A certificated repair station must have established housing and facilities. However, only the requirement to provide suitable

housing to enclose the largest type and model aircraft for airframe-rated repair stations has been waived by § 145.205(d). The FAA understands that housing and facilities at airports is extremely difficult to obtain and expensive to maintain.

4-7. CONTRACT MAINTENANCE INFORMATION.

a. References:

- Section 145.209(h),
- Section 145.211(c), and
- Section 145.217.

b. Contract Maintenance. The regulations allow a repair station to contract any maintenance, preventive maintenance or alteration for which it holds a rating. A certificated repair station may not provide only approval for return to service of a complete type certificated product following contract maintenance, preventive maintenance, or alterations. The contract work can be performed by FAA-certificated or noncertificated entities when the repair station takes responsibility for the work scope performed by issuing an approval for return to service. In order to exercise the contracting privilege, the repair station must:

(1) Make a list of maintenance functions that it:

(a) Is certificated to perform but requests approval to contract out; and,

(b) Takes regulatory responsibility for issuing an approval for return to service for the exact same work under its rating.

(2) Obtain approval of the listed functions in accordance with § 145.217 and provide the list to the FAA in accordance with the procedures in § 145.209.

(3) Ensure that it qualifies the entities to which it contracts those maintenance functions in accordance with § 145.201(a)(2) (quality system).

(4) Maintain a current list of those contractors in accordance with § 145.217 and provide the list to the FAA in accordance with § 145.209.

(5) Ensure that it has procedures to perform the incoming inspection, final inspection and return to service of articles in accordance with the pertinent subparagraphs of § 145.211(c)(1).

(6) Provide a procedure that confirms by inspection or test that the work was performed satisfactorily (which may be able to be determine by review of the paperwork setting forth the exact steps performed and the inspections and tests performed) in accordance with § 145.217.

NOTE: Purchase of maintained parts from another repair station (including exchanges), brokerage and using another certificated repair station to perform work that is outside the original repair station's ratings are not maintenance functions requiring FAA approval. These are instances where the purchasing repair station is not exercising the privileges of its certificate. When a repair station requests work or sells a previously maintained article (including type certificate products) it is acting solely as a distributor. Although the purchasing repair station may induct the part through its receiving inspection process, it is merely relying on the work previously performed at another certificated entity and is not exercising the privileges under 145.201(a)(2).

c. Contract Maintenance Information Required by § 145.217. The RSM must contain procedures for maintaining and revising the contract maintenance information required by § 145.217. This information is required for contracting to both FAA-certificated and noncertificated facilities. The information required includes the approved maintenance function to be contracted, the name of each outside facility to which the repair station contracts such maintenance and the type of certificate and ratings held, if any. The QCM/section should describe the system and procedures used for qualifying both FAA-certificated and noncertificated entities and surveilling noncertificated entities who perform maintenance, preventive maintenance, or alterations for the repair station. These procedures may be contained in one manual or in separate documents that are part of the manual system.

d. Material and Equipment. A repair station must have the material and equipment necessary to perform the functions appropriate to its rating. However, it need not have the tools and equipment for functions it is authorized to contract out pursuant to its FAA approved list of maintenance functions. When exercising the privileges of its certificate, a repair station may contract maintenance functions to FAA-certificated facilities and non-FAA-certificated entities only if the maintenance functions are approved by the FAA. The repair station must request approval before it can contract a maintenance function. If the FAA approves the contracted maintenance function, the repair station will determine who performs the maintenance.

(1) The types of maintenance functions that the repair station may wish to have approved fall into two categories. First, the types of maintenance functions that must be contracted because the repair station does not have the housing, facilities, materials, or equipment available on its premises and under its control. These may include plating, heat treatment, special Nondestructive Testing (NDT) or inspection, or the maintenance or alteration of components or sub-assemblies. This list should be categorized broadly, such as specialized services or components of articles for which the repair station has the overall rating.

(2) The repair station may also wish to provide a list of those maintenance functions for which it has the housing, facilities, equipment, and materials "in-house," but may need to contract to another facility because of workload or emergency situations. For example, an airframe rated repair station may have the capability to perform maintenance or alteration on landing gear, but if the in-house facility cannot accomplish the work scope within a specified time, it may want to contract that work to another facility. It would not be able to contract the

work unless the maintenance function of landing gear maintenance was on its FAA-approved list.

(3) Additionally, the repair station may wish to provide a method for which a maintenance function can be added to its FAA approved function list on an emergency basis. This would be accomplished by explaining how the maintenance function would be added and how the FAA approval would be obtained in a short period of time. The repair station should coordinate closely with its principal inspector and its local CHDO regarding these emergency procedures.

e. Establish Procedures. Before contracting out a function, the repair station should establish:

(1) Procedures to obtain approval for the maintenance function.

(2) Procedures to qualify the contractor.

(3) Procedures to surveil the contractor if the contractor does not perform approval for return to service.

(4) A list of contractors and procedures to properly maintain that list.

(5) Technical training on contracted functions for receiving inspection personnel.

(6) Procedures for receiving inspections that provide enough technical detail to determine acceptability of an article.

(7) Procedures for complying with the test and/or inspection requirement of § 145.217(b)(3) when contracting to a noncertificated person.

f. Contracting to FAA-Certificated Facilities. A certificated repair station may not provide only approval for return to service of a complete type-certificated product following contract maintenance, preventive maintenance or alterations. If the repair station chooses to exercise the privileges of its certificate by issuing an approval for return to service for a maintenance function contracted to an FAA-certificated repair station, the repair station must determine that the contracted repair station is properly rated to perform the maintenance. A repair station may issue an additional approval for return to service under its privileges, such as tagging a previously maintained or altered article as inspected, provided the repair station:

(1) Has the appropriate rating for the article,

(2) Is approved to contract out the maintenance function, and

(3) Conducts the maintenance, preventive maintenance or alteration, including inspection in accordance with § 43.13 and part 145.

g. Contracting Maintenance Functions to Noncertificated Persons.

(1) If the repair station contracts to noncertificated persons, the repair station must ensure that:

(a) The noncertificated person follows a quality control program equivalent to the FAA-certificated repair station's system with respect to the work being performed for the certificated repair station;

(b) The repair station remains directly in charge of the work performed;

(c) The repair station verifies by inspection or test that the work was performed satisfactorily; and

(d) The article is airworthy with respect to the work performed by the noncertificated person.

(2) The repair station must verify by test or inspection that the work has been performed satisfactorily and that the article is airworthy before approving it for return to service.

h. Procedures. Procedures in the RSM should include the title of the person responsible for the contract maintenance program. The procedures must also include provisions for maintaining the contracting information in a format acceptable to the FAA. The information is not required to be in the manual, but if included, it must identify:

(1) The name of each outside contracted source,

(2) The maintenance function(s) contracted to each source, and

(3) The type of certificate and ratings, if any, held by each source.

i. Initial Qualification. The procedures in the RSM must describe how the noncertificated person is initially qualified. It also should describe how the repair station ensures that the noncertificated person continues to follow the quality control program equal to the repair station's for the work being performed on the repair station's behalf.

j. Coordinating Communications. Procedures for coordinating communications between the repair station and the contracted source should be established. If the repair station performs any maintenance for an air carrier, the procedures should explain any special requirements (such as performing the work in accordance with the air carrier's program). Procedures should describe how the repair station would address any problems with quality or delivery. Any recurring problems should be addressed in the corrective action program.

k. FAA Inspections. Maintenance contracts with noncertificated persons must include provisions that allow the FAA to make an inspection and observe the noncertificated person's work on that article. The RSM should include procedures to ensure that contracts contain the provision for FAA inspections. The individual in charge of the contract maintenance program or a delegated assistant/auditor may be required to accompany the FAA during these inspections.

These inspections will determine if the repair station is able to continue to contract the maintenance function(s) to a noncertificated person.

I. Initiating Procedures. The following questions or concerns are offered as a guide and are intended to help initiate the procedures in the RSM(s). They should not be considered all-inclusive. Each facility is unique and may require additional procedures to verify regulatory requirements and the repair station's needs.

- (1) Who, by title, is responsible for the contract maintenance program?
- (2) What is the title of the person responsible for maintaining the list of contract maintenance functions?
- (3) What is the title of the person responsible for maintaining the list of facilities to which maintenance functions are contracted?
- (4) What is the title of the person responsible for forwarding revisions of the lists to the CHDO?
- (5) How will the CHDO approve additions to the list of maintenance functions?
- (6) When will the CHDO be notified of revisions to the list?
- (7) How will the CHDO be notified?
- (8) If the list is maintained on electronic media, does the CHDO have compatible hardware and software to review/refer to the contract maintenance list and procedures?
- (9) Who will maintain current copies of the Air Agency Certificates and OpSpecs for the FAA-certificated contract sources (initial as well as revisions)?
- (10) Do the contract provisions for noncertificated persons include provisions for FAA inspection?
- (11) How will certificated and noncertificated maintenance contract sources be qualified?
- (12) How often will the repair station surveil the contracted noncertificated persons?
- (13) Are the auditors that inspect contract maintenance sources trained?
- (14) How is the receiving inspection performed on articles returned after maintenance from certificated and noncertificated sources?
 - (a) Are the receiving inspectors properly trained?
 - (b) Do the receiving inspectors have the appropriate technical data to determine airworthiness?

(c) What criteria are used to determine if the contracted source is meeting all requirements?

(d) Are discrepancies with contracted sources included in the repair station's corrective action program?

4-8. PROFICIENCY OF INSPECTION PERSONNEL.

a. References:

- Section 145.211,
- Section 145.155,
- Section 145.157, and
- Section 145.161.

b. Requirements of Inspection Personnel.

(1) This section of the manual must include procedures for establishing and maintaining proficiency of inspection personnel. Section 145.155 requires the repair station to ensure that inspection personnel are thoroughly familiar with the following:

(a) Applicable regulations.

(b) Inspection methods, techniques, practices, aids, equipment, and tools used to determine the airworthiness of the article.

(2) Inspection personnel must also be proficient in using the various types of inspection equipment and visual inspection aids appropriate for the article being inspected. Inspectors must be listed on a roster and also understand, read, and write English.

c. Establish the Qualifications of the Inspection Personnel. Procedures in this section of the manual should address how the repair station will establish the qualifications of the inspection personnel. This initial qualification may be based on testing or previous experience or training. If the inspector has previous experience, the employment records should describe the type of inspections and maintenance work performed, methods and techniques used, and total years of experience as an inspector, as required by § 145.161. The procedure should establish the minimum amount of experience required before an inspector can be listed on the roster, and who by job title will make that determination.

d. Training. The procedures should also describe how inspectors become qualified through on-the-job training (OJT) and/or formal classroom training. This training may be described in this section of the manual or in the section describing the training program for all repair station personnel. Training should include initial qualification as well as recurrent training or testing to maintain proficiency. Inspection personnel may also require additional special training in new techniques. This may be necessary after additional components are added to the

ratings or capabilities of the repair station or when new inspection aids or techniques are applied. Inspectors performing NDT may need to meet the qualification requirements of other industry standards, such as eye exams.

e. Specifications and Current Data. Inspection personnel need current technical data to properly perform their tasks. They need to understand current specifications involving inspection tolerances, limitations, procedures established by the manufacturer, SBs, and ADs. Inspection personnel also need to be familiar with the RSM and QCM for the repair station, as well as the applicable Federal aviation regulations. Procedures in the manual should address where the technical data is located, who is responsible for maintaining the current data, and how the inspectors will be made aware of changes.

f. Authority to Approve an Article for Return to Service. If the person performing the final inspection is also authorized to approve an article for return to service, that person must be certificated under part 65 for repair stations located within the United States. If the repair station is located outside the United States, the person authorized to perform a final inspection and approve an article for return to service must meet the requirements of § 145.157. If final inspection personnel are authorized to approve an article for return to service, procedures in the manual will need to address how they are authorized and qualified.

g. Initiate Procedures in the QCM. The following questions or concerns are offered as a guide and are intended to help initiate the procedures in the QCM. They should not be considered all-inclusive. Each facility is unique and may require additional procedures to verify regulatory requirements and the needs of the repair station.

(1) How does the repair station establish minimum qualifications for inspection personnel? What is the title of the person making this determination?

(2) How will the inspector maintain proficiency? What methods are used?

(3) Do the records of training indicate the method, length, instructor, and dates? Are they current?

(4) Do the employment records of the inspectors describe any previous experience?

(5) Is the necessary current technical data available and accessible for the inspectors?

(6) What is the title of the person responsible for ensuring that inspectors maintain proficiency?

(7) Are the inspectors listed on the roster?

(8) Do the inspectors read, write, and understand English?

(9) Are the persons performing RII inspections and approvals for return to service certificated under part 65 (if in the United States)?

(10) Will the inspectors require any special training, such as NDT? Who will be responsible for the training? How will the repair station ensure that NDT personnel continue to meet any required industry standards?

4-9. CURRENT TECHNICAL DATA.

a. References:

- Section 43.13(a),
- Section 145.201(c), and
- Section 145.211(b).

b. Currency of Technical Data. This section of the manual must contain the procedures for ensuring that current technical data is available for the scope of work the repair station is performing. Section 43.13(a) requires each person performing maintenance, alteration, or preventive maintenance to use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual, Instructions for Continued Airworthiness (ICA), or other methods, techniques, or practices acceptable to the Administrator. Section 145.201(c) states that a certificated repair station may not approve for return to service any article unless the maintenance, preventive maintenance, or alteration was performed in accordance with the applicable approved technical data or data acceptable to the FAA.

c. Data Used. The technical data used by repair stations could include any of the following:

- (1) FAA technical data (such as ADs, Type Certificate Data Sheets, etc.).
- (2) Manufacturer's technical data (such as maintenance manuals and SBs).
- (3) Engineering data (such as DER-approved data or data developed by the repair station and approved by the FAA).

d. Availability. The data used by the repair station to perform a specific maintenance function must be current and available to maintenance and inspection personnel when the maintenance is being performed. The procedures should ensure that someone in the facility is responsible for maintaining the technical data in a current condition. Status of the manuals may be confirmed by making periodic phone calls to the manufacturer, etc. The procedures should ensure that any subscriptions to required technical data are renewed as necessary. The procedure should describe how the revised technical data will be inserted into existing documents and how the appropriate individuals in the repair station will be notified about revisions.

e. Document Control Procedures. In some repair stations, the technical data is issued in the form of controlled documents. Procedures for these facilities will need a complete description of the document control system, including distribution, accountability, and availability. Document control procedures may include:

(1) Approval of the documents before distribution.

(2) Identification of changes.

(3) Provisions to ensure that relevant versions of applicable documents are available at points of use.

(4) Provisions to ensure that documents of external origin are identified and controlled.

(5) Procedures to prevent the use of obsolete documents.

f. Master Library. Larger repair stations may include provisions for distributing data from a master library to individuals or shop libraries throughout the facility. The procedure must ensure accurate and timely distribution of the material. Additional procedures will need to address who revises the shop library documents, how the documents are revised, and how the information is distributed.

g. Manufacturer's Drawings and Data. Repair stations that are associated with or part of a production approval holder facility often use the manufacturer's drawings and data to perform maintenance. This data may not meet the requirements of § 43.13(a). These facilities should also be cautioned that the parts manufactured by the production side of the facility cannot be used by the repair station unless the parts are FAA-approved through a Parts Manufacturer Approval (PMA), Technical Standard Order (TSO), Type Certification (TC), or other means.

h. National Language. Technical data used by repair stations located outside the United States may be translated into the national language. If the data requires translation before distribution, the procedures must ensure an accurate, timely, and complete translation. Provisions should be made for quality control personnel to review and approve the translated material before distribution. The technical data that needs to be translated may include graphs, diagrams, or other visual aids. The repair station must retain in English any data that demonstrates compliance with the requirements of part 43.

i. Software Revisions. Those facilities that use computer software for component testing (of airborne systems or equipment, avionics systems, engines, etc.) will need to include procedures describing how revisions/updates are made and how the current software is distributed. The procedures will need to address system security to prevent inadvertent changes to the software and methods to ensure that only the current revision/version of the software is used. Distribution and revision of software is often handled by a group other than those responsible for revision and distribution of paper documents.

j. Guide. The following questions or concerns are offered as a guide and are intended to help initiate the procedures in the manual. They should not be considered all-inclusive. Each facility is unique and may require additional procedures to verify regulatory requirements and the needs of the repair station.

(1) What is the title of the person responsible for revising and maintaining the technical data?

(2) How does the repair station ensure that the data is current?

(3) How is the technical data distributed throughout the company?

(4) How does the repair station ensure that current technical data is available to the staff?

(5) What is the title of the person responsible for control and distribution of the documents from a master library to the shop/office libraries located in the facility?

(6) If the technical data requires translation, who is responsible for performing the translation and quality checks? How will the data be revised and distributed?

(7) If the repair station uses computer software for component testing, who is responsible for maintaining the software, and how are revisions made and distributed?

4-10. INSPECTION AND QUALITY CONTROL SYSTEM.

a. References:

- Section 145.211, and
- Section 145.213.

b. System and Procedures. This section of the manual must include a description of the system and the procedures used for:

(1) Inspecting incoming raw materials to ensure acceptable quality.

(2) Performing preliminary inspections of all articles that are maintained.

(3) Inspecting all articles involved in an accident for hidden damage.

(4) Performing the final inspection and approval for return to service of maintained articles.

c. Guide to Initiate Inspection Procedures. The concerns or questions in the following paragraphs are offered as a guide and are intended to help initiate the inspection procedures in the QCM/section. They should not be considered all-inclusive. Each facility is unique and may require additional procedures to verify regulatory requirements and the needs of the repair station.

d. General. Describe the inspection system in detail, from establishing the purchase of aviation articles and how that material is inspected upon receipt, receiving customer's articles, progressing through each inspection step, and ending in final inspection and approval for return to service. Describe each step in a format easily understood by the employees. A flowchart may be helpful in developing these procedures. This section should also describe the system for controlling and documenting the work in process (work order system).

e. Reporting Malfunctions or Defects. Section 145.221 requires the repair station to notify the FAA within 96 hours after discovering any failure, malfunction, or defect of an article. Many repair stations use FAA Form 8010-4, Malfunction or Defect Report, to comply with this requirement. Information for completion of this form maybe found in AC 20-109, current edition. Examples of the types of information received on these reports may be found in AC 43-16, Aviation Maintenance Alerts, current edition. The regulation also states that the repair station may submit a Service Difficulty Report—Aeronautical Equipment, FAA Form 8070-1, for a certificate holder operating under 14 CFR parts 121, 125, or 135. Information on completing Form 8070-1 is attached to the form. The repair station should not report the same failure, malfunction, or defect using more than one report. The manual should contain procedures describing how the report will be completed and forwarded to the FAA. A copy of the form and instructions for its completion should be included in the forms section of the manual.

f. Continuity of Inspection Responsibility. Include procedures for ensuring that the responsibilities of its inspectors are properly performed if they cannot complete the task. If the facility uses multiple shifts, include procedures to ensure a continuing responsibility for maintenance in progress with status books, shift change logs, or similar documents.

g. Receiving Policy. This section of the manual should address the procedures used for accepting consumable materials and customer parts. Procedures included within this section will depend on the size, complexity, and ratings of the facility. The manual should describe generally how material is ordered, stocked, and requisitioned for maintenance or alteration purposes. A general description of how the stock room operates with respect to handling and storage should be included in this section. Additionally, this section may include the method for handling, storing, and using shelf life items and materials.

(1) Procedures should include visual inspection of the container and contents for shipping damage, packing, and proper paperwork. This section should include procedures to assist receiving personnel in performing their tasks, whether the article was satisfactory or damaged when it was received. The procedures would normally include how receiving personnel document or record damage due to improper handling and the title of the person notified of the damage. The description of the procedure may include the routing of materials and parts.

(2) Receiving personnel may need to review paperwork received with articles maintained by other facilities contracted by the repair station or parts received from foreign manufacturers. All foreign-produced engines, propellers, and parts received into the part 145 repair station must be in full compliance with the applicable bilateral, BASA agreement or 14 CFR part 21, § 21.305(d).

(3) Articles produced in the United States and exported would be under the control or jurisdiction of the receiving authority and not under the jurisdiction of the FAA regulatory system. Until these articles are moved back under the control of the U.S., regulatory system they could not be returned to service under the provisions of parts 43 and/or 145.

(4) If the Repair station is dual certificated under another authority they could perform the approval using the other authorities certification such as: European Aviation Safety Agency (EASA) or JAA 145.

(5) Section 43.1 (applicability) sets forth the requirements for any approval for return to service. Parts that do not meet the requirements of § 43.1 would not be eligible for an approval for return to service in accordance with § 43.9.

(6) The contracting section of this AC has further information on contracting maintenance functions. The procedure should also cover how parts are stored and requisitioned for particular work.

h. Handling of Parts. Section 145.103(a) requires the repair station to provide sufficient space to segregate articles and materials stocked for installation from those articles undergoing maintenance, preventive maintenance, or alterations. Throughout the maintenance cycle, care will be necessary when handling parts and components undergoing maintenance. The procedures in the manual should emphasize that personnel will always need to exercise caution when handling aviation articles. These procedures may be contained in one section of the manual or may be spread out through several sections of the manual. The procedures may discuss segregation and protection of parts, avoiding metal-to-metal contact, contamination, and preservation. Moving articles from one area of the repair station to another requires procedures to ensure that articles are not damaged in transit. Facilities that maintain sensitive electronic equipment will need to describe the necessary precautions to be taken for static discharge.

i. Tagging and Identification. All articles undergoing maintenance within the facility should be identified in some manner depending on the size, complexity, and ratings of the repair station. Many facilities attach colored tags or work orders to the part. The objective of identification is to ensure that the status of any article can be easily determined. Articles awaiting repairs may be identified differently than those that are repaired. Articles that are deemed non-repairable should be clearly identified, and may need to be stored in a segregated area within the facility. Parts in the store room(s) will need to be identified to ensure traceability to an approved source.

j. Incoming Inspection. The QCM/section must include procedures that describe the incoming inspection of raw materials used by the repair station for maintenance, preventive maintenance, or alteration. These materials could include hardware, sheet metal, welding rods, etc., as well as component parts. The procedures should define what is considered raw material and describe how the material will be inspected. Procedures should describe the disposition/action taken when an item passes or fails inspection. The manual should also include procedures for handling suspected unapproved parts. Some raw materials may require specific documentation or certifications that must be kept on file by the repair station. Procedures should address how this documentation is reviewed and filed. Sometimes, raw materials are received in lots that are released from stock in smaller units, such as weld wire, NDT fluids and films, and coating powders. For such situations, the manual will need to include procedures that insure traceability of the material back to the original lot. The procedures should address the following, as applicable:

(1) What is the title of the person(s) performing these inspections?

(2) How will the inspection be performed? Does the inspection include visual, NDT, or dimensional tolerances (if applicable)?

- (3) What technical data will be necessary to perform this inspection?
- (4) Is the material checked for damage, identification, and preservation?
- (5) Does the material have any shelf life limitations? If so, the procedures need to address how the material will be identified and controlled.
- (6) Describe the action taken if the material meets specification, as well as what action is taken if the material does not meet specification.
- (7) Does the facility have an area for proper storage of raw materials? Will the material require a secure area until released for use? Will the material require any special environmental considerations during storage?
- (8) How is the material identified if acceptable or not acceptable?
- (9) Do the materials require any special testing requirements? If so, what procedures are followed to perform those tests? How is the testing performed?
- (10) What is the disposition of incoming inspection records?
- (11) How does the repair station ensure traceability of materials received in lots, such as weld wire, coating powders, and so forth?
- (12) What are the procedures for detecting and reporting suspected unapproved parts?

k. Preliminary Inspection. The procedures must address what constitutes a preliminary inspection, how that inspection will be performed, and how the article will be identified throughout the repair cycle. This inspection is usually an evaluation of an article to determine the customer requested work scope and the required maintenance or alteration actions. Compliance with SBs and ADs should also be determined. This inspection may involve a teardown or disassembly if the article is an engine, module, propeller, accessory, or subassembly of a larger component. The results of this inspection should be documented and may need to be communicated to the customer. The forms used to record this inspection should identify the article until the maintenance/repair cycle is completed. For some repair stations this may include attaching the form to the article while it is still in the repair cycle. Other repair stations that use more electronic means, such as bar codes, may not need to physically attach the form but another type of identification so that the status of the article can be determined as needed. Any defects or discrepancies noted during this inspection will need to be documented with corrective actions taken during the maintenance, using a discrepancy numbering system or similar arrangement. The repair station should notify the customer of any defects that are outside the scope of the customer's authorized repair. Maintenance providers are responsible only for the work they are contracted to perform, not for all the work that needs to be performed. The procedures should address the following:

- (1) Who (by title) will perform this inspection?
- (2) How will the inspection be performed?

- (3) When is this inspection performed?
- (4) Is the repair station properly rated to perform this maintenance?
- (5) Does the inspection include a functional test before disassembly?
- (6) How will the inspection be recorded?
- (7) If the inspection reveals discrepancies, how are they recorded?
- (8) How does the repair station record corrective actions taken to correct any discrepancies?
- (9) Do the records show the relationship between the discrepancies found and the corrective action taken?
- (10) How is the customer notified of discrepancies found that are outside of the contracted work scope? How are those discrepancies resolved?
- (11) Is the record of this inspection made part of the work order file (work package)?
- (12) How is traceability of life limits and/or time since overhaul documented?
- (13) How are the parts identified if acceptable and if not acceptable?
- (14) What are the procedures to ensure the records (work package) are kept with the parts?
- (15) Is there a procedure to ensure that current technical data is available before inspection?
- (16) What are the procedures for detecting and reporting unapproved parts?
- (17) Is there a procedure for reporting failures, malfunctions, or defects of an article?

1. Hidden Damage Inspection. This inspection is required on parts that have been involved in an aircraft accident. The inspection includes a search for any secondary damage that could result from an accident, such as fire or heat damage. This inspection is often recorded on the same form used for the preliminary inspection. Sometimes the repair station is not notified that an article has been involved in an aircraft accident. Inspection personnel should be experienced enough with the article to recognize damage that is suspicious. The repair station could then initiate communications with the customer regarding damage history of the article. The hidden damage inspection should address the following:

- (1) Who (by title) will perform the inspection?
- (2) How will the inspection be recorded?
- (3) If defects are noted, where will they be recorded?

(4) Does the inspection include areas adjacent to obvious damage?

(5) Who will communicate with the customer?

(6) Is the record of this inspection made part of the work order file?

m. In-Process Inspection.

(1) These inspections may take place during various stages of disassembly, repair, and reassembly of an article. These inspections are usually described in the maintenance manuals or other ICA used to perform the maintenance or alteration and called out on the work order, traveler, or router. Usually, they require the services of a qualified inspector to perform a visual, dimensional, or non-destructive test. The inspection may require functional tests and/or precision test equipment. Persons performing these inspections should be qualified and listed on the roster.

(2) If the article has been shipped to another facility for contracted maintenance, that function must be inspected. The inspector may also review the documentation received from the vendor, such as certifications(s) or other maintenance records required by § 43.9. If a noncertificated person performed the maintenance, an inspection and/or test is required to determine whether the maintenance was performed satisfactorily.

(3) Who (by title) will perform the inspection?

(4) Are the inspectors listed on the roster?

(5) How will the inspection be recorded?

(6) If defects or discrepancies are noted, where will they be recorded?

(7) Do the procedures allow steps to be performed out of sequence? If so, how is this authorized and recorded?

(8) If the in-process inspection is not satisfactory, does the manual have procedures governing rework? Any rework must be performed in accordance with approved or acceptable technical data.

(9) Does the system include provisions for recording the names of the inspector and the person who performed the work?

(10) Are the records of this inspection made part of the work order (records package)?

(11) Who determines when an in-process inspection is performed, and how is that determined?

(12) Do the procedures describe the inspection of an article and review of documentation for maintenance performed by a contracted facility?

n. Final Inspection. This inspection is performed on each article before it is approved for return to service. Final inspection should include a review of documents used during the

maintenance (travelers, inspection sheets, discrepancy sheets, etc.) as well as an inspection of the article. The repair station may develop a checklist to ensure that all activities related to final inspection are performed. The individual performing this inspection must meet the requirements of § 145.155, which requires the person to be thoroughly familiar with the applicable regulations and the inspection methods, techniques, practices, aids, equipment, and tools used to determine airworthiness of the article. The person must be proficient in using the various types of inspection equipment and visual inspection aids appropriate for the article being inspected. The person must be able to understand, read, and write English. As stated in § 145.213, except for individuals employed by a repair station located outside the United States, only an employee certificated under 14 CFR part 65 is authorized to sign off on final inspections and maintenance releases for the repair station.

(1) Who (by title) will perform the inspection?

(2) How will the inspection be recorded?

(3) If the final inspection is not satisfactory, does the facility have procedures governing rework? Any rework must be performed in accordance with approved or acceptable technical data.

(4) Is the inspector qualified and certificated?

(5) Before the final airworthiness determination is made, are all other maintenance, inspection forms, electronic media, and records checked for completion? How is this indicated?

(6) Is the final inspector authorized on the roster of inspection personnel?

(7) How is the inspection performed?

(8) Once the final inspection is completed, how are the parts identified?

(9) Are the final inspection personnel familiar with the regulations and the inspection techniques?

(10) Do the inspectors understand, read, and write English?

(11) Do the final inspectors have access to current technical data?

(12) Are procedures included for when the final inspection results in accepting the part and when it results in rejection of the part?

(13) If the repair station performs 100-hour and/or annual inspections, are procedures included for addressing the use of inspection cards and/or forms, checklists, etc., to record the inspection and correct any discrepancies? Are procedures for deferral of inoperative equipment if the operator has an FAA-approved minimum equipment list also included?

(14) If the maintenance performed was a major repair or major alteration, are procedures included to ensure that the inspector who inspects the article and approves it for return to service is trained, qualified, and authorized?

o. Work Sign-Off.

(1) Many repair stations use rubber stamps or electronic media instead of signatures to annotate the completion of a task on a traveler, work order, process sheet, inspection sheet, or similar document. The intent of the stamp or electronic sign-off is to ensure traceability to the name of the person who performed or inspected the work. The stamp or electronic sign-off used is often more legible than hand-written initials. If the repair station chooses to use stamps or electronic media, it should have a control program that addresses the following:

(a) Who issues the stamps, badges, or authorizations?

(b) What procedures are used to ensure that the method used can be traced to the individual who issued the authorization (a list of names and stamps, or similar document)?

(c) Are there procedures to check that the stamps, if used, are still legible?

(d) Are there procedures to ensure that the stamp, badge, or authorization is returned to or revoked by the responsible manager upon termination or re-assignment of an employee?

(e) Are procedures and training on the security of the system used (stamps or electronic)?

(2) Exemptions from the regulations will no longer be required to use electronic media because the rule allows the use of electronic systems. The repair station must have procedures that fully describe the system and its use.

p. Maintenance Release and Approval for Return to Service.

(1) The maintenance release document must meet the requirements of part 43, §§ 43.9 and 43.11. Many repair stations have chosen to use FAA Form 8130-3, Authorized Release Certificate, Airworthiness Approval Tag as a maintenance release. Instructions for completion of FAA Form 8130-3 are in Order 8130.21, Procedures for Completion and Use of the Authorized Release Certificate, FAA Form 8130-3, Airworthiness Approval Tag (current edition). Those facilities that are EASA certificated must use FAA Form 8130-3 as a maintenance release for articles returned to EASA member countries.

(2) Regardless of the format, the contents must include:

(a) A description (or reference to data acceptable to the FAA) of the work performed. In either case there must be enough information provided so that a person unfamiliar with the work would be able to determine the extent of the maintenance and/or alteration performed. If the repair station is also EASA-certificated, the maintenance release must include the revision status of the technical data used to perform the work. The maintenance release also

should include a record of the parts used, particularly if the maintenance involved substituting parts, such as PMA parts.

(b) The date the article is approved for return to service.

(c) The name of the person who performed the work (in this case the repair station).

(d) The name of the individual authorized by the repair station to approve the article for return to service. As required by § 145.157, for repair stations located within the United States, the person authorized to approve an article for return to service must be certificated under part 65.

(e) If the maintenance was performed on an article that is life-limited, include the total time and total cycles. If the article requires periodic overhaul under an air carrier or commercial operator's maintenance program, include the time since overhaul.

(3) If the repair station is performing maintenance for an air carrier, the repair station should follow the maintenance release procedures described in the air carrier's manual. The forms and procedures may differ from those the repair station normally uses.

(4) The approval for return to service may be a separate document, included in the work order, or entered into the aircraft maintenance records. If the maintenance was a major repair, the repair station may use a work order instead of FAA Form 337 to record the work and approve the article for return to service (see section 43, appendix B for details). If the maintenance performed was a major alteration, the repair station must use FAA Form 337 to record the work and approve the work performed for return to service. AC 43.9-1, Instructions for Completion of FAA Form 337 describes how to complete FAA Form 337. If the repair station chooses to use FAA Form 337, a copy of the form and instructions for its completion should be included in the forms section of the manual.

(5) Procedures for approval for return to service should include the following (as applicable):

(a) Who (by title) is authorized to complete the form? How is the individual authorized?

(b) Is the person certificated under part 65 if employed by a U.S. repair station?

(c) Do the procedures ensure that a qualified and authorized person can assume the responsibilities of this task if the person who normally performs it is not available (e.g., sick, on vacation, etc.)?

(d) Does the maintenance release include or reference a list of approved parts?

(e) How does the repair station ensure that it approves for return to service only those articles for which it is rated?

(f) How does the repair station determine if the repair or alteration is major? If the maintenance was a major repair or major alteration, how will it be recorded?

(g) Who (by title) is authorized to complete FAA Form 337, and how is that person authorized?

(h) What records are given to the customer, and what records are maintained on file at the repair station?

(i) Have the people that complete the approval for return to service been trained for this position? Is the training documented?

4-11. REQUIRED RECORDS AND RECORDKEEPING.

a. References:

- Section 43.9,
- Section 145.209(i), and
- Section 145.219.

b. Describe the System. The RSM must include a description of the required records and the recordkeeping system used to obtain, store, and retrieve those records. The records must be in English and comply with part 43.

c. Requirements. Section 43.9 describes the content, form, and disposition of maintenance, preventive maintenance, and alteration records. The content must include a description of the work performed, the date the work was completed, and the name of the person performing the work. It also must include the signature, certificate number, and type of certificate of the person approving the work for return to service. For major repairs made in accordance with an FAA-approved manual or other approved data, the repair station may use the customer's work order to record the repair or use FAA Form 337. The repair station must use FAA Form 337 to record major alterations. Instructions for completion of FAA Form 337 are in AC 43.9-1, current edition.

d. Sample Formats. Records may be in different formats depending on the type of work performed. Samples of the various forms that are part of the repair station's records must be included in the manual or can be maintained in a separate "forms" manual.

e. Air Carrier's Procedures. Maintenance record entries for an air carrier should be completed in accordance with the air carrier's procedures. The entries may include the use of forms specifically required by the air carrier. The procedures, forms, and records may differ from those normally used.

f. Contents of Work Package. The procedures should describe the contents of the facility's work package, if applicable. This work package may include a traveler or router that describes each step of the maintenance or alteration performed. It may contain areas for the

signatures or identifiers such as stamps, bar codes, badge numbers, and electronic signatures of the person performing the work and of the inspector. If the facility performs aircraft inspections, the records should include the checklist used to perform the inspections, discrepancy lists, and corrective actions needed and/or taken, including compliance with any ADs and/or SBs. If the repair station performs repairs in accordance with DER-approved technical data, a copy of FAA Form 8110-3 should be included in the records package. DER-approved technical data will normally require additional FAA approval when used for major alterations. (See FAA Order 8110.37, Designated Engineering Representative (DER) Guidance Handbook, for DER authorization. Supplemental forms in a work package may include, but are not limited to:

- (1) A list of replacement parts.
- (2) Inspection methods sheets.
- (3) SB and/or AD compliance sheets.
- (4) Copies of manufacturer's technical data.
- (5) Functional test and/or calibration results.

g. Maintenance Release. The repair station must provide a copy of the maintenance release to the owner/operator. If the repair station chooses to use FAA Form 8130-3 as a maintenance release, the records must include a copy of the completed form. The procedures should describe who would review the records for accuracy and completeness before approval for return to service, unless that information is included elsewhere in the manual.

h. Availability. Records must be made available to the FAA and the National Transportation Safety Board (NTSB). Records should be organized for easy retrieval. Procedures should describe the location of the records and the system used to retrieve those records. Some repair stations store records in a remote location. The manual must include procedures describing its retention interval and retrieval process. Storage provisions should include environmental protection as well as security.

i. Requirements. The procedures should include the title of the person responsible for maintaining the records for the repair station and where the records will be located. The records must be maintained for at least 2 years from the date the article was approved for return to service. The customer purchase order or contract may require storage for a longer period of time.

j. Electronic Recordkeeping Systems.

(1) When constructing an electronic recordkeeping system, several elements must be considered and addressed in the RSM or the directions for using the electronic system. Those directions must be available to each person using the system. The electronic system must ensure that the information is confidential and cannot be altered without authorization.

(2) Before introducing an electronic system, a computer operation procedures manual should be established. The manual should include the following:

(a) Procedures for making required records available to the NTSB and/or FAA personnel. An employee or a representative who is familiar with the computer system may need to assist NTSB or FAA personnel in accessing the computerized information. The computer system must be capable of producing paper copies of the viewed information at the Administrator's request.

(b) A procedure for conducting a review of the computerized personal identification codes system to prevent password duplication (if applicable).

(c) Procedures for periodic audits of the computer system to ensure the integrity of the system and each workstation.

(d) A procedure to ensure that any records for an aeronautical product are transferred to the owner/operator with the required information in an acceptable format, either electronically or on paper.

(e) A description of the training procedure and requirements needed for access to the computerized system.

(f) Procedures addressing periodic backup of records and files.

(3) The repair station must provide a copy of the procedures for implementing an electronic recordkeeping system to the CHDO. The FAA addresses guidelines and requirements for electronic signatures in AC 120-78.

(4) Addressing the following questions or concerns (as applicable) will help the repair station develop procedures for this section. The repair station may need to develop additional procedures, depending on the size and complexity of the facility.

(a) Who (by title) is responsible for maintaining the recordkeeping system?

(b) What documents are included in a typical records package? What additional forms may be included?

(c) Where are the records stored?

(d) What method is used to organize the records?

(e) Are the records easily retrieved?

(f) Who (by title) reviews records for accuracy and completeness before approval for return to service? Is the individual trained?

(g) If the FAA Form 8130-3 is used, does the repair station include a completed copy in the records package?

(h) If electronic records are used, procedures for security, backup, and retrieval of files must be established.

- § 43.9?
- (i) Are the records in English, and do they meet (at a minimum) the requirements of § 43.9?
 - (j) What records will be provided to the owner/operator?
 - (k) How will the repair station process records received from contractors?
 - (l) Are procedures included for distribution and storage of FAA Form 337?
 - (m) How does the repair station document any special inspections, such as hydrostatic tests, functional tests, and so forth?

4-12. CALIBRATION OF MEASURING AND TEST EQUIPMENT.

a. References:

- Section 43.13(a),
- Section 145.211(c), and
- Section 145.109(b).

b. Calibration Procedures. Section 145.211(c) requires that the repair station QCM contain the procedures used for calibrating measuring and test equipment, including the intervals at which the equipment will be calibrated. Section 145.109(b) states that a certificated repair station must ensure that all test and inspection equipment and tools used to determine airworthiness of articles are calibrated to a standard acceptable to the FAA.

c. Measuring Tools and Equipment. This section of the manual should explain the repair station system for controlling and performing calibration of the precision tools and test equipment used to make airworthiness determinations, sometimes referred to as measuring tools and equipment. The repair station is responsible for the calibration program, whether calibration is performed in-house or contracted to outside sources. The calibration must be traceable to a standard acceptable to the FAA, which includes those recommended by the manufacturer and the National Institute of Standards and Technology (NIST) or other national authority. The measuring equipment must be calibrated at regular intervals, which are established by the manufacturer or the repair station. The repair station should maintain records of the calibration for at least 2 years.

d. List of Equipment. The repair station should maintain a list of calibrated equipment by name, model or part number, serial number, date of calibration, and next calibration due date. If the repair station allows employee-owned measuring and test equipment to be used in the facility, these tools must be included in the calibration system. Many facilities choose to maintain the calibration system records and techniques on a computer. A computerized list enables those facilities to manage a large list of equipment requiring periodic calibration. The individual performing the calibration will need to have experience and/or training on the computer system as well as on calibration techniques.

e. Training. Personnel calibrating tools and equipment will need to have the knowledge, training, or experience necessary to ensure proper calibration. Records of the training or experience will need to be in each employee's training file or employment summary.

f. Calibration Controls. Procedures will need to address how and when the equipment is recalled for calibration and the title of the person responsible for ensuring that the equipment is returned to the calibration technician. The procedures should also describe how the facility determines calibration status of a new tool or piece of equipment before it is put into service.

g. Calibration Records.

(1) Calibration records should include the following:

- (a) The name of the person who performed the calibration.
- (b) Date of calibration.
- (c) Date next calibration is due.
- (d) The standard used to perform the calibration.
- (e) The method used to perform the calibration.
- (f) The results of the calibration.

(2) The results of the calibration should include the actual readings of the equipment at the test points. If the station intends to revise calibration intervals, pass or fail notations will not suffice. The calibration interval cannot be increased without sufficient recorded data points (calibration history) to justify a change. The procedures should state the title of the person responsible for maintaining the records and where the records will be maintained.

h. Gage Calibration Techniques. If the repair station calibrates its own equipment, a series of gage calibration techniques should be developed. These techniques should describe exactly how the tool or equipment is calibrated, including the standard used, test points, accuracy required, and records. The techniques could be those recommended by the manufacturer or an industry standard acceptable to the FAA. The technique may include provisions to safeguard the equipment from adjustments that would invalidate results (tamper proofing).

i. Identifying Calibrated Equipment. Calibrated equipment should be identified in some manner to prevent the inadvertent use of non-calibrated equipment in the maintenance process. The identification usually includes the serial number or other identification, date of last calibration, date calibration is due, and the name or initials of the person who performed the calibration. It is important that the equipment's serial number can be identified if the label is removed or lost. All calibrated tools and equipment should be protected from damage and deterioration during handling, maintenance, and storage.

j. Identifying Non-Calibrated Equipment. The facility may use some equipment that does not require calibration if that equipment is not used to make airworthiness determinations.

The procedures should describe how that equipment is identified and controlled. Other equipment may have limited calibration, and the limitations should be clearly marked on the equipment or label.

k. Guide to Initiate the Calibration Procedures. The following questions or concerns are offered as a guide and are intended to help initiate the calibration procedures in the QCM. They should not be considered all-inclusive or applicable to all facilities.

- (1) Who (by title) is responsible for the calibration system?
- (2) What is the basis for the test intervals (manufacturer, standard industry practice, etc.)?
- (3) Is the calibration technique recommended by the manufacturer or standard industry practice?
- (4) How is calibrated equipment identified?
- (5) Is the calibration technique documented?
- (6) What procedure is used to change calibration intervals?
- (7) Are actual calibration results recorded to justify changes to calibration intervals?
- (8) Is calibration of tools traceable to NIST or manufacturer's standards, or an accepted foreign or international standard?
- (9) If foreign equipment is used, is the calibration standard acceptable to the FAA?
- (10) Do the procedures ensure that equipment is removed from service and calibrated when due?
- (11) Do the procedures include recall of the product inspected if the measuring equipment was out of tolerance when calibrated?
- (12) How is equipment handled if it is not submitted for calibration when it is due (i.e., lost or overdue)?
- (13) How is calibration recorded? Are actual results recorded at each test point?
- (14) If the repair station uses automated test equipment, is it included in the calibration system?
- (15) Does the procedure describe the information on the calibration label of the equipment?
- (16) How is equipment that must be calibrated before each use identified and recorded?

- (17) How is equipment that does not require calibration identified?
- (18) What are the procedures for calibration of employee-owned tools?
- (19) Do the procedures address the acceptance of new precision test equipment into the inventory?
- (20) Do the procedures address calibration performed by an outside contractor?
- (21) Do the procedures address calibration requirements, standards, documentation, and traceability of tools that the repair station has leased?
- (22) Who (by title) is responsible for records of calibration received from outside contractors?
- (23) Do the procedures describe the review of the contracted calibration facility's records for traceability, accuracy, and acceptability?
- (24) Is the person performing the calibration qualified? Do the training records or employment records reflect his or her qualifications?
- (25) Does the equipment used to perform the calibration have the required accuracy?
- (26) If the facility includes an engine or auxiliary power unit test cell, does the manual include procedures for correlation, calibration, and limitations, if any?
- (27) For facilities that perform NDT, does the manual include procedures for certification of company-manufactured NDT standards (if any are used)?

4-13. TAKING CORRECTIVE ACTION ON DEFICIENCIES.

a. Reference. Section 145.211(c).

b. Procedures. Section 145.211(c)(1)(ix) states that the QCM must include procedures used for taking corrective action on deficiencies. Corrective action is taken to remedy an undesirable situation. Deficiency correction is normally an integral part of a repair station's improvement process, and could include revisions to procedures that were not working properly.

(1) Corrective action would be applicable before the article is approved for return to service and after the article has been approved for return to service. The RSM should describe the system by which reworks are identified and corrected before an article is approved for return to service. In these cases, a review of the housing, facilities, equipment, personnel qualifications, and procedures should ensure that the deficiency was not a systemic problem. If the review indicates that the procedure is deficient, the corrective action should include a thorough review and improvement of the procedure. If the review indicates that the personnel lacked training or qualifications, corrective action should remedy the deficiency. In either event, the procedures must address how reworks are documented.

(2) After the article is approved for return to service, the repair station may avail itself of the self-disclosure program addressed by AC 00-58, Voluntary Disclosure Reporting Program. This AC describes the procedures for voluntary reporting of potential violations of the regulations. Once an article is approved for return to service, discrepancies are often evidence of a potential violation of the regulations, particularly § 43.13. Therefore, the repair station should carefully review the referenced AC for the appropriate method of notifying the FAA. The repair station should have a procedure for ensuring the quality of the work performed and for handling customer returns or complaints.

c. Examples. The following scenarios are presented as examples of the intended use of a corrective action program:

(1) Scenario 1. During the final inspection process of an aircraft in the repair station for a major inspection, the chief inspector performs a review of the paperwork. During that review, the inspector discovers that one of the discrepancies found during the inspection has not been corrected. Further review of the paperwork reveals that no repairs were performed to correct this discrepancy. Discussions held with the mechanics working on the aircraft reveal that a part is on order to complete the repair. The chief inspector asks why no one wrote on the paperwork that the part is on order. One of the mechanics replied that there are no instructions anywhere that direct them where to write that a part is on order. The procedure requires the mechanic to describe the actions taken to clear the discrepancy, and to sign in the appropriate block. The procedure does not address what action to take if a part is on order. What first appeared as a failure of the mechanic to write that a part is on order turned out to be a lack of written procedures in the manual. By taking the time to develop a written procedure for the mechanics to follow, the repair station corrected the deficiency.

(2) Scenario 2. The repair station overhauls “widgets,” which are components of a turbine engine. Part of the overhaul process involves application of a special coating to the bore of the widget, followed by machining to final diameter. The repair station contracts the application of this coating to another facility. During the machining operation, several areas of the coating are chipped completely off the bore. Since this condition is unacceptable, the bore must be stripped and re-coated. After experiencing this condition on several parts, the repair station conducts an investigation into the root cause. A review of the machining process indicated all recommended procedures were followed. The repair station, in coordination with the contracted facility, conducted a review of the process used to apply the coating. The investigation revealed a malfunction of the spray equipment, allowing the coating to be applied incorrectly. The spray equipment was repaired and adjusted, eliminating the problem. What first appeared as a machining problem turned out to be an application problem. By taking the time to conduct a thorough investigation into the root cause, future problems were eliminated.

d. Inadequacies and Deficiencies. Inadequate procedures, environment, working conditions, training, instructions, or resources may be factors for many deficiencies that are attributed to human error. The involvement of personnel from several levels within the organization (if appropriate) will contribute to the program and ensure quality. Corrective action requires that the root cause or causes of the discrepancy be investigated and determined in order to eliminate such causes. The investigation must be fact-based and typically begins with an analysis of the potential causes of the discrepancy. It is usually helpful to have a small team of

informed and involved individuals associated with the article/process. Although human factors may play a part, focus should be placed on physical factors, such as workplace environment, facilities, equipment, and tooling; process factors, such as clarity of instructions; and training/understanding of methodology for the work to be properly accomplished. Flow or process diagrams of the maintenance process for the affected article are a typical starting place. Typically, each item in the process, and interactions between such items, are questioned/analyzed in an attempt to determine which either caused or contributed to the ultimate deficiencies. Often the interactions result in a cumulative effect that results in the deficiency. Once each potential weakness is identified, the individual/team analyzes each to correct the findings. The product is checked to determine whether the corrective action has accomplished the elimination of the deficiency/discrepancy.

(1) A documented procedure for taking corrective action on deficiencies should answer the following:

- (a)** What is the title of the person responsible for the program?
- (b)** How is the root cause of the problem determined? Will any interim steps need to be taken to prevent delivery of deficient products while the corrective action is implemented?
- (c)** Who (by title) will initiate corrective action?
- (d)** How much time will be allowed for the corrective action to be implemented?
- (e)** Who (by title) will perform a follow-up audit of the corrective action to ensure that it was effective?
- (f)** What records will be maintained of the cause and corrective action taken?

(2) For those facilities that elect to conduct regularly scheduled management review meetings, the investigation, cause, and corrective actions taken to prevent recurrence of discrepancies should be a topic of discussion during those meetings.

APPENDIX 1. FORMS

a. Reference. Section 145.211(c)(3).

b. Forms and Instructions. Section 145.211(c)(3) requires that the QCM contain a sample of the inspection and maintenance forms and the instructions for completing such forms. Or, the manual may refer to a separate forms manual, which provides examples of the forms with instructions.

c. Included Samples. The forms included in this section should be samples of any form, tag, and label described in the procedures within the RSMs. The instructions for completing the form may be on the form or on a separate document. The number and content of the forms will depend on the size of the repair station and the complexity and the variety of the articles for which the repair station is rated. Revisions or additions to the form section of the manual should follow the documented revision procedures.

d. Factors to Consider. Some factors to consider when developing instructions for completing a form are:

(1) How should the form be introduced (at what point during the maintenance process), and when should it be completed?

(2) Who is the person or department responsible for starting the form, who will contribute to its completion, and who will finish all required entries on the form?

(3) How will the form be completed?

(4) What is the purpose of the form and how will it fit into the system?

(5) How should revisions to the form be accepted/approved before release (if applicable)?

(6) How will the form fit into the recordkeeping system?

(7) Which detailed inspection forms and checklists should be used when performing annual, 100-hour, progressive or other approved inspection programs, or engine overhaul inspection sheets? These need not be included in the manual. These forms should be referenced in the manual, and instructions for completing these forms (if required) may be in a separate document.

(8) Do forms that are used for multiple operations or work have adequate space and appropriate instructions, including specific assignment of responsibility, to ensure that they can be filled out properly?

(9) Do the instructions direct the user to write N/A (not applicable) or N/R (not required), and initial/date any blocks on the form that are not used?

(10) Will retention and storage be done in accordance with § 145.219(c)?

(11) No examples of forms are offered in this AC because forms must be developed to fit the needs of each repair station.

APPENDIX 2. CHECKLIST

a. The following checklist is provided as a guide for reviewing the completed manual(s). This checklist was not developed to be all-inclusive and should be modified to fit the type of operation and complexity of the repair station. Some suggested items may not be applicable to all repair stations.

b. Manual Revision and Control.

(1) Who will initiate, write, and submit revisions to the FAA for review and acceptance?

(2) How will the repair station incorporate changes to revisions found not acceptable to the FAA? How will the repair station correct any maintenance/administrative actions performed under revisions that were found not acceptable to the FAA?

(3) How and where is the acceptance of the manual noted, including how the FAA will receive its revisions?

(4) How will the revisions be distributed?

(5) Does the procedure ensure that each manual holder receives each revision?

(6) Will the revised text of each affected page be clearly identified?

(7) Do the procedures include control of sections of the manual, such as identification, revision status, page numbering, issue date, and approvals/acceptance?

(8) Do the procedures to control sections of the manual address (as applicable) identification, revision status, page numbering, issue date, and approvals of internal personnel responsible for the manual and revisions?

c. Organization.

(1) Does the manual include an organization chart that shows, by title, each manager with authority to act on behalf of the repair station?

(2) Are the titles for the positions the same throughout the manual?

(3) Does the organizational chart show separation of maintenance and inspection departments (if applicable)?

d. Personnel.

(1) Does the manual describe the duties and responsibilities, including the area of responsibility assigned, of each management position?

(2) Does the narrative describe what each person does?

(3) Do the procedures ensure that their duties and responsibilities are performed in each person's absence?

(4) Does the manual include procedures for maintaining and revising the rosters required by § 145.161?

(5) Does the manual include procedures for maintaining the employment summaries for each person whose name is on the roster?

(6) Does the manual include procedures for applying for additional repairmen and for maintaining the certificates?

(7) Does the manual include a procedure for surrendering repairman certificates when required by part 65?

(8) Do the employment summaries meet the requirements of § 145.161?

e. Operations, Housing, and Facilities.

(1) Does the manual include a drawing showing the facility's floor plan, shops, and equipment?

(2) Is a description of the facility (narrative) included?

(3) Is the operation of the repair station described?

(4) Are any special environmental conditions addressed?

(5) Does the description include a generic overview of the equipment?

(6) If the repair station leases or rents equipment, does the manual contain procedures describing the lease/rent process and who is responsible for managing the program?

(7) How does the repair station ensure the equipment is in place and under its control when the work is performed?

(8) If the repair station is using special equipment or tools other than those recommended by the manufacturer, does the manual include procedures for determining equivalency?

(9) Does the manual include a description of the stock room, how inventory is requisitioned for particular jobs, and how shelf life inventory is maintained?

f. Capability List.

(1) Who (by title) will maintain the capability list?

(2) How will the self-evaluation be performed?

(3) Who will perform the self-evaluation?

(4) How is the self-evaluation documented?

(5) Do the checklists and forms address all of the applicable requirements of part 145 (e.g., housing, facilities, equipment, tools, technical data, and personnel)?

(6) How will results of the self-evaluation be reported to management?

(7) Does the procedure describe how items are added to and deleted from the list?

(8) Are changes to the list clearly indicated on the document?

(9) If electronic media is used, are the hardware and software compatible with that of the CHDO?

g. Training Program Revision.

(1) Who is responsible for submitting training program revisions to the FAA?

(2) When will the revision be submitted?

(3) How will the revision be approved (include the repair station approval as well as FAA)?

(4) How often will the training program be reviewed for currency and completeness?

(5) Who will perform the review?

(6) How will revisions be recorded and implemented?

(7) How will the revised text be identified?

h. Work Performed at Another Location.

(1) For a one-time special circumstance:

(a) Who will notify the CHDO, and how?

(b) How and where will the approval/denial be recorded?

(2) If the repair station intends to perform work at another location on a regular basis, does the manual include procedures for:

(a) The preparations and conditions to be met prior to performing any work?

(b) Who is responsible for supervising the maintenance performed at another location?

(c) Ensuring that the applicable sections of the RSM are available at the remote site?

(d) Ensuring that adequate tools, equipment, and current technical data are available at the site?

(e) When and how the article is inspected?

(f) How the work is recorded? Do the records meet the requirements of §§ 43.9 and 43.11? Are the forms used at the remote location the same as those used within the repair station? Who is responsible for transporting and storing the records? Where will they be stored?

i. Maintenance Performed for an Air Carrier.

(1) Who is responsible (by title) for keeping a file of the air carrier's procedures, including the necessary technical data?

(2) Who is responsible (by title) for review and amendment of purchase orders for complete and correct instructions? Is that person trained?

(3) How does the repair station maintain a current list of RII inspectors? Who maintains the list?

(4) Does the RSM include procedures to ensure that the necessary equipment, trained personnel, and technical data will be available for line maintenance?

(5) Does the manual describe the training program for air carrier maintenance and RII?

j. Contract Maintenance Information.

(1) What is the title of the person responsible for the contract maintenance program?

(2) What is the title of the person maintaining the list of contracted facilities and contract maintenance functions?

(3) What is the title of the person responsible for forwarding revisions of the list to the CHDO?

(4) When and how will the CHDO be notified of revisions to the list?

(5) How will the repair station determine if the contracted facility is properly rated?

(6) Do the contract provisions for non-FAA-certificated facilities include provisions for FAA inspection?

(7) How does the repair station qualify and audit FAA-certificated and noncertificated entities.

(8) Are the auditors who inspect contract maintenance entities trained?

(9) How do the receiving inspectors inspect articles returned after maintenance from FAA-certificated and noncertificated entities? Are they trained?

(10) Are discrepancies with contracted entities included in the corrective action program?

k. Proficiency of Inspection Personnel.

(1) How are minimum qualifications for inspection personnel established? Who makes this determination?

(2) How will the inspector maintain proficiency? Training? On-the-job training? What methods are used?

(3) Do the records of training indicate the method, length, instructor, and dates? Are they current?

(4) Who is responsible for ensuring that inspectors maintain proficiency?

(5) Does the final inspector authorize approval for return to service? If so, is this inspector certificated (if within the United States)?

(6) Will the inspectors require any special training, (i.e., NDT)? Who will be responsible for the training? How will inspectors continue to meet any required industry standards?

l. Current Technical Data.

(1) What is the title of the person responsible for revising and maintaining the technical data?

(2) How does the repair station ensure that the technical data is current?

(3) How is the technical data distributed throughout the company?

(4) How does the repair station ensure that current technical data is available to the staff?

(5) What is the title of the person responsible for control and distribution of the technical documents?

(6) If the technical data require translation, who is responsible for performing the translation and quality checks? How will the data be revised and distributed?

(7) If computer software is used for component testing, how are revisions made and distributed? Who is responsible for ensuring that the software is operating properly and that the current revision is in use?

m. Inspection System.

(1) General.

- (a) Does the manual include procedures for reporting malfunctions or defects?
- (b) Does the manual contain procedures that ensure continuity of inspection responsibility?
- (c) Does the manual contain procedures for segregation of repairable from non-repairable articles?
- (d) Does the manual include a procedure for tagging or identifying articles, including repairable and non-repairable articles?

(2) Receiving Policy.

- (a) Who (by title) performs the inspection, and how is it performed?
- (b) How is the inspection recorded?
- (c) What actions are required if the container and/or material was damaged?
- (d) How is the material routed for proper storage?
- (e) What is the required documentation from contracted facilities?

(3) Incoming Inspection.

- (a) Who (by title) will perform this inspection?
- (b) How will the inspection be performed? What technical data will be necessary to perform this inspection?
- (c) Does the manual include procedures for control of items that have shelf life limitations?
- (d) Do the procedures describe the action taken if the material meets specification, as well as what action is taken if the material does not meet specification?
- (e) How is the material identified if acceptable or not acceptable?
- (f) Do the materials require any special testing requirements? If so, what procedures are followed to perform those tests? How is the testing performed?
- (g) What is the disposition of incoming inspection records?
- (h) How is traceability of materials received in lots, such as weld wire and coating powders, ensured?

(i) Does the manual contain procedures for detecting and reporting suspected unapproved parts?

(4) Preliminary Inspection.

(a) Who (by title) will perform this inspection, and how will it be performed?

(b) When is this inspection performed?

(c) How will the inspection be recorded?

(d) If the inspection reveals discrepancies, how are they recorded?

(e) How is corrective action taken to correct any discrepancies?

(f) Do the records show the relationship between the discrepancies found and the corrective action taken?

(g) Is the record of this inspection made part of the work order file (work package)?

(h) How is traceability of life limits and/or time since overhaul ensured?

(i) How are the parts identified if acceptable and if not acceptable?

(j) Does the manual include procedures to ensure that the records (work package) are kept with the parts?

(k) Does the manual include a procedure to ensure that current technical data is available before inspection?

(l) Does the manual include procedures for detecting and reporting unapproved parts?

(m) Does the manual include a procedure for reporting failures, malfunctions, or defects of an article?

(5) Hidden Damage Inspection.

(a) Who (by title) will perform the inspection?

(b) How will the inspection be recorded?

(c) If defects are noted, where will they be recorded?

(d) Does the inspection include areas adjacent to obvious damage?

(e) Who will communicate with the customer?

(f) Is the record of this inspection made part of the work order file?

(6) In-Process Inspection.

- (a) Who (by title) will perform the inspection, and how is it performed?
- (b) How will the inspection be recorded?
- (c) If defects or discrepancies are noted, where will they be recorded?
- (d) Do the procedures allow steps to be performed out of sequence? If so, how is this authorized and recorded?
- (e) If the in-process inspection results are not satisfactory, does the manual have procedures governing rework?
- (f) Do the forms used in the inspection system record both the name of the person who performed the work and the inspector?
- (g) Are the records of this inspection made part of the work order (records package)?
- (h) Who determines when an in-process inspection is performed, and how is that determined?
- (i) Do the procedures describe the inspection of an article and review of documentation for maintenance performed by a contracted facility?

(7) Final Inspection.

- (a) Who (by title) will perform the inspection?
- (b) How will the inspection be recorded?
- (c) If the final inspection is not satisfactory, does the manual have procedures governing rework?
- (d) Before the final airworthiness determination is made, are all other maintenance, inspection forms, and records checked for completion? How is this indicated?
- (e) How is the inspection performed?
- (f) After the final inspection is completed, how are the articles identified?
- (g) Does the manual include procedures for when the final inspection results in accepting or rejecting the article?
- (h) If the repair station performs 100-hour and/or annual inspections, does the manual include procedures addressing the use of inspection cards and/or forms, checklists, etc., to record the inspection and correction of any discrepancies? Does the manual also include

procedures for deferral of inoperative equipment if the operator has an FAA-approved minimum equipment list?

(i) If the maintenance performed was a major repair or major alteration, does the manual include procedures to ensure that the inspector who inspects the article and approves it for return to service is trained, qualified, and authorized?

(8) Work Sign-Off.

(a) Who (by title) issues the stamps, badges, or authorizations?

(b) Do the procedures ensure that the method used can be traced to the individual who was issued the authorization (a list of names and stamps or similar document)?

(c) Does the manual include procedures to check that the stamps (if used) are still legible?

(d) Do the procedures ensure that the stamp, badge, or authorization is returned to or revoked by the responsible manager after termination or reassignment of an employee?

(e) Does the training include security procedures for the system used (stamps or electronic)?

(9) Approval for Return to Service.

(a) Does the form meet the requirements of §§ 43.9 and 43.11?

(b) Who (by title) is authorized to complete the form? How is he/she authorized?

(c) Do the procedures ensure that a qualified and authorized person can assume the responsibilities of this task if the person who normally performs it is not available (e.g., sick, on vacation, etc.)?

(d) Does the maintenance release document include or reference a list of approved parts?

(e) Do the procedures ensure that only those articles for which the repair station is rated are approved for return to service?

(f) Do the procedures describe how the repair station will determine if the repair or alteration is major? If the maintenance was a major repair or major alteration, do the procedures describe how it will be recorded?

(g) Who (by title) is authorized to complete FAA Form 337, and how is that person authorized?

(h) What records are given to the customer, and what records are maintained on file at the repair station?

n. Required Records and Recordkeeping.

- (1) Who (by title) is responsible for maintaining the recordkeeping system?
- (2) What documents are included in a typical records package? What additional forms may be included?
- (3) Where are the records stored?
- (4) Who (by title) reviews records for accuracy and completeness before approval for return to service? Is the individual trained?
- (5) If the repair station uses electronic records, does the manual describe the procedures, including security, back-up, and retrieval?
- (6) Are the records in English, and do they meet (at a minimum) the requirements of § 43.9?
- (7) What records will be provided to the owner/operator?
- (8) How will the repair station process records received from contractors?
- (9) Are procedures for distribution and storage of FAA Form 337 included?
- (10) How are records of any special inspections, such as hydrostatic tests, functional tests, and so forth, processed?

o. Calibration of Measuring and Test Equipment.

- (1) Who (by title) is responsible for the calibration system?
- (2) What is the basis for the test intervals, such as manufacturer, standard industry practice, and so forth?
- (3) Is the calibration technique recommended by the manufacturer or standard industry practice?
- (4) How is calibrated equipment identified?
- (5) Is the calibration technique documented?
- (6) What procedure is used to change calibration intervals?
- (7) Are actual calibration results recorded to justify changes to calibration intervals?
- (8) Do the procedures ensure that calibration is traceable to NIST, the manufacturer, or an acceptable foreign or international standard?

(9) Do the procedures ensure that equipment is removed from service and calibrated when due?

(10) Do the procedures include recall of any product inspected if the measuring equipment was out of tolerance when the work was performed?

(11) How is equipment that is not submitted for calibration when it is due handled, i.e., lost or overdue?

(12) How is calibration recorded? Are the actual results at each test point recorded?

(13) If automated test equipment is used, is it included in the calibration system?

(14) Does the procedure describe the information on the calibration label of the equipment?

(15) How is equipment that must be calibrated before each use identified and recorded?

(16) How is equipment that does not require calibration identified?

(17) Do the procedures address the acceptance of new precision test equipment into the inventory?

(18) Do the procedures address calibration performed by an outside contractor?

(19) Do the procedures address calibration of employee-owned tools?

(20) Who (by title) is responsible for records of calibration received from outside contractors?

(21) Do the procedures address calibration requirements, standards, documentation, and traceability of tools that the repair station has leased?

(22) Do the procedures describe the review of the contracted calibration facility's records for traceability, accuracy, and acceptability?

(23) If the facility includes an engine or auxiliary power unit test cell, does the manual include procedures for correlation, calibration, and limitations, if any?

(24) If NDT is performed, does the manual include procedures for certification of company-manufactured NDT inspection standards (if any are used)?

p. Taking Corrective Action on Deficiencies.

(1) Who (by title) is responsible for the program?

(2) How is the root cause of the problem determined?

- (3) Who (by title) will initiate corrective action?
- (4) How much time will be allowed to implement the corrective action?
- (5) Who (by title) will perform a follow-up audit of the corrective action to ensure that it was effective?
- (6) What records will be maintained of the cause and corrective action taken?