VOLUME 2 AIR OPERATOR AND AIR AGENCY CERTIFICATION AND APPLICATION PROCESS

CHAPTER 11 CERTIFICATION OF A PART 145 REPAIR STATION

Section 3 Safety Assurance System: Phase 3—Design Assessment (SAS Business Process Modules 2, 3, and 4)

2-1216 GENERAL. The Design Assessment (DA) phase is the part of the certification process when the applicant's manuals and other documents are reviewed indepth to ensure compliance with applicable regulations and conformity to safe operating practices.

NOTE: These documents may include paper representation or electronic format. Advisory Circular (AC) 145-9, Guide of Developing and Evaluating Repair Station and Quality Control Manuals, provides guidance to develop a Repair Station Manual (RSM) and Quality Control Manual (QCM). AC 145-10, Repair Station Training Program, provides guidance to develop a training program.

A. Organization. An important responsibility of the certification project manager (CPM) is to organize the certification team's efforts to promptly review the applicant's manuals and other documents. The Schedule of Events (SOE) determines what will be examined and when. The previously agreed-upon SOE will determine the priority of items to be reviewed and any additional inspector support or other Federal Aviation Administration (FAA) resources that will be needed beyond the composition of the basic certification team. The DA phase is an intensive process and will most likely require additional resources to accomplish necessary tasks in a timely manner. The certificate-holding district office (CHDO) certification team may be augmented by other FAA resources.

B. Plan for Review. The plan for review should ensure that each of the required manuals or documents submitted by the applicant will be reviewed in accordance with procedures and criteria outlined in the other volumes of this order. Ensure that the Comprehensive Assessment Plan (CAP) has been developed to complete all elements. Principal inspector (PI) instructions for each DA will include at least the following: "Name of Inspector" conducting the inspection; indication of who is designated as "team coordinator (TC)" and/or "team member;" and the proposed completion date. Any additional Custom Data Collection Tool (C DCT) created by the CPM during initial certification will annotate "initial certification" in the National/Local/Field block when creating the C DCT. The compliance statement directs the inspector to the location in the applicant's manuals where a compliance procedure is described.

C. Resource Management. The CPM will provide input to the Front Line Managers (FLM) to help them identify team resources to complete each Element Design Data Collection Tool (ED DCT). The FLMs will determine resource availability and assign TCs and team members to support the plan. The FLM will concur with the CAP.

2-1217 REVIEW OF APPLICANT'S SUBMISSIONS. During this phase, members of the certification team evaluate and approve or accept the applicant's manuals and any other required documents. Review of the applicant's submissions should be accomplished by simultaneous reference to Title 14 of the Code of Federal Regulations (14 CFR), the compliance statement,

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and the appropriate manual or document. The following are examples of typical submissions from applicants during the DA phase. This list is not all-inclusive, and certain items may not be applicable to a particular type of operation.

- Supervisory personnel résumés outlining proposed supervisory qualifications and compliance histories.
- Applicant submitted ED DCTs or a Custom ED DCT.
- RSM.
- QCM (may be combined with the RSM).
- Training program/manual (may be combined with the RSM or QCM; however, the training program must be approved).
- Exemption requests.
- Letter stating compliance with 14 CFR part 145, § 145.53(c) or (d).
- Hazardous materials (hazmat) program.
- Letter of compliance that all applicable regulatory requirements are addressed.
- Proposed operations specifications (OpSpecs).

2-1218 THE COMPLIANCE STATEMENT. Compliance statement purposes:

A. Applicable Regulatory Requirements. It ensures that the applicant has adequately addressed all regulatory requirements applicable to the proposed operation.

B. Intent to Comply with Regulatory Requirements. It aids the certification team in determining where the regulatory requirements have been addressed in the applicant's manuals, programs, and procedures. In evaluating the applicant's compliance statement, the certification team may find it helpful to compare (in a side-by-side manner) the regulations, the applicant's manuals, and the compliance statement. The compliance statement documents how the applicant intends to comply with each applicable regulation.

2-1219 OPSPECS. The CPM will coordinate with the applicant and draft OpSpecs in the Web-based Operations Safety System (WebOPSS).

2-1220 DATA COLLECTION (Module 4A).

A. Accuracy Verification and Data Analysis. The Certification Project Team (CPT) will verify accuracy of the applicant-completed ED DCTs or Custom ED DCTs and complete their assigned ED DCTs or Custom ED DCTs. The CPT will collect and analyze the data by conducting a data analysis meeting. If the current submission is not of sufficient quality and/or when additional data is necessary, notify the applicant with a written explanation of concerns identified during the data analysis meeting. If a subsequent submission contains minimal concerns which will allow the PI to approve or accept the program with mitigation, schedule and conduct a meeting with applicable members of the CPT and the applicant to discuss and correct the remaining discrepancies.

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B. Letter to the Applicant. The letter must advise the applicant that they must return the next revision as an entire submission accompanied by revised applicant-completed ED DCTs. The applicant will label all documents in the revised submission in sequential order (e.g., Revision B, Revision C). Also, the applicant will use their manual revision process when revising their manuals (e.g., change bars).

NOTE: The certification team should remember that it is the applicant's responsibility to develop manuals and procedures that ensure safe operating practices and compliance with the rules.

2-1221 DATA REPORTING (Module 4B). Each team member will then enter their responses into the Safety Assurance System (SAS). Enter "Initial Cert." in the "Local/Regional/National" field on the "Common Data" screen. Save data by clicking "Submit".

NOTE: If an inspector observes any finding(s) not related to their assigned element, or he or she cannot capture it in their assigned element, document the finding(s) in a Dynamic Observation Report (DOR) and notify the inspector(s) working that element.

2-1222 DATA REVIEW (Module 4C). The data reviewer will ensure that data meets the data quality guidelines (DQG) and submit to Analysis, Assessment, and Action (AAA).

2-1223 ANALYSIS AND ASSESSMENT (Module 5A). Along with the identified members of the CPT, the CPM conducts an Element Design Assessment (EDA) meeting to analyze ED DCT collected data by element. The CPM will make a bottom-line assessment and document it in AAA.

2-1224 ACTION (Module 5B). Follow the Module 5 business process to determine the appropriate course of action for each element.

NOTE: The applicant must maintain an active project. The CHDO must evaluate an inactive period that exceeds 90 days. Inactivity of greater than 90 days may be cause to terminate the certification process, or you may terminate the process when it is clear that continuing the process will not result in approval or acceptance (i.e., multiple failures of the applicant's submissions).

RESERVED. Paragraphs 2-1225 through 2-1229.

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Section 5 Safety Assurance System: Phase 5—Administrative Functions

2-1244 GENERAL. Issue the certificate and the approved operations specifications (OpSpecs) to the applicant after correcting all unsatisfactory items. This action completes the certification process. The Federal Aviation Administration (FAA) will not, under any circumstances, certificate an applicant until the certification project manager (CPM) determines that the applicant is fully capable of fulfilling his/her responsibilities as charged by Title 49 of the United States Code (49 U.S.C.) (formerly the Federal Aviation Act of 1958 (FA Act)) and that the applicant will comply with Title 14 of the Code of Federal Regulations (14 CFR) in an appropriate manner.

2-1245 COMPLETE FAA FORM 8310-3, APPLICATION FOR REPAIR STATION CERTIFICATE AND/OR RATING. When the applicant has met all regulatory requirements, the principal inspector (PI) will complete blocks 6 through 10 of FAA Form 8310-3 to show:

- Remarks or discrepancies noted during inspection;
- Findings and recommendations;
- Date of inspection; and
- Office and signature of the PI.

2-1246 PREPARE AIR AGENCY CERTIFICATE. The certificate will include the following information (also see Volume 2, Chapter 1, Section 4).

A. Certification Number. After “Number,” insert the certificate number assigned to the facility. This will be in accordance with the current air agency numbering system. For a satellite repair station, ensure that the certificate number listed is appropriate for the satellite.
For additional information on certificate number construction, see Volume 2, Chapter 1, Section 3.

B. Applicant’s Name. Under “This certificate is issued to,” insert the official name of the applicant’s business. This must be the same as shown on the application form. The acronym doing business as (DBA) will precede any additional business names listed.

C. Applicant’s Address. Under “whose business address is,” insert the address/location of the applicant’s business. This must be the same as shown on the application form.

D. Approved Repair Station. After “to operate an approved,” insert the words “repair station” or “satellite repair station,” as appropriate.

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E. Ratings. Under "with the following ratings," insert the ratings issued. List the ratings by the general category, such as airframe, powerplant, or radio.

1) Limited ratings are issued to a certificated repair station (CRS) that maintains only a particular type of airframe, engine, propeller, radio, instrument, accessory, or part thereof; or provides specialized maintenance requiring equipment and skills not ordinarily performed under other repair station ratings. Such a rating may be limited to a specific model aircraft, engine, constituent part, or to any number of parts made by a particular manufacturer.

NOTE: Under the rating "Any other purpose for which the FAA finds the applicant's request is appropriate," the purpose will be identified and listed on the Air Agency Certificate (e.g., Limited-Unit Loading Device). Clearly identify the actual article.

2) When ratings are added or amended, show the date of each issuance in parentheses following the added or amended rating.

F. United States Repair Station. After "must continue in effect," for repair stations located in the United States, insert the word "indefinitely."

G. Issuance Date. Under "Date issued," insert the issuance date of the certificate. This will be the date of original certification. Future changes or amendments to the certificate will not affect this date unless a new certificate number is issued.

H. Signatures. Under "By direction of the Administrator," insert the signature of the Office Manager (OM) and office identifier.

2-1247 ISSUANCE OF OPSPECS AND A CERTIFICATE.

A. Regulatory Requirements Met. After determining that the applicant has met all regulatory requirements, the applicant receives the appropriate certificate and OpSpecs. Prepare the OpSpecs in accordance with the procedures described in Volume 3, Chapter 18, Section 10.

B. Signatures. Before issuing the OpSpecs, the applicant and the appropriate PIs will sign it. Please see Volume 3, Chapter 18, Section 2, for more information on digital signatures and delegation procedures. The new certificate holder will then receive the original certificate and OpSpecs.

2-1248 CERTIFICATION REPORT. When the new operator receives certification, the CPM is responsible for assembling a certification report. The CPM must sign the report, which includes the name and title of each team member who assisted in the certification project. During the business life of the air agency, maintain the report in the permanent file relating to the new operator. The report will consist of the following seven documents:

- Preapplication Statement of Intent (PASI);
- Certification Job Aid and Schedule of Events (SOE);
- FAA Form 8310-3, completed;
- The compliance statement;

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- A copy of the OpSpecs issued;
- A copy of the issued Air Agency Certificate;
- A copy of any Temporary Airman Certificate issued; and
- A summary of major difficulties experienced during the certification process and/or any recommendations noted by phase and specialty that may enhance the process.

NOTE: For the Certification Job Aid and SOE, see Volume 2, Chapter 11, Section 1, Figure 2-86, Five Phases of Certification and Requirements of the Gate System for Part 145; and Figure 2-87, Schedule of Events for Part 145 Repair Stations.

2-1249 CERTIFICATION REPORT RETENTION. The district office will retain the original of the certification report in the agent's file as long as the certificate holder remains active.

2-1250 TASK OUTCOMES.

A. Follow Safety Assurance System (SAS) Guidance. Follow SAS guidance for the completion of the certification project in the automation. It is imperative that the PI is assigned to the certificate prior to the CPM being removed.

B. Document the Task. File all supporting paperwork in the certificate-holding district office's (CHDO) file.

2-1251 FUTURE ACTIVITIES. Follow SAS guidance in Volume 10.

NOTE: The applicant must maintain an active project. The CHDO must evaluate an inactive period that exceeds 90 business-days. Inactivity of greater than 90 business-days may be cause to terminate the certification process, or you may terminate the process when it is clear that continuing the process will not result in approval or acceptance (i.e., multiple failures of the applicant's submissions).

RESERVED. Paragraphs 2-1252 through 2-1256.

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CHAPTER 11 CERTIFICATION OF A PART 145 REPAIR STATION

Section 10 Safety Assurance System: Certificating/Renewing/Amending a Part 145 Repair Station Located Outside the Territories of the United States and Not Under a BASA/MIP

2-1327 REPORTING SYSTEM(S). Use Safety Assurance System (SAS) automation and the associated Data Collection Tools (DCT) for initial certification, renewal and updating Vitals configuration.

2-1328 GENERAL.

A. Direction and Guidance. This section is to be used in conjunction with Volume 2, Chapter 11, Sections 1 through 6 and 13, for the certification/renewal and amendment of Title 14 of the Code of Federal Regulations (14 CFR) part 145 repair stations.

B. Professional Conduct. Each aviation safety inspector (ASI) assigned to an International Field Office (IFO) must be conscious of sensitive issues associated with working in the international environment. Inspectors must conduct themselves with the highest degree of professionalism while assigned outside the United States. An inspector must be courteous and respectful when dealing with foreign nationals and the various officials of the foreign aviation authorities (AA). Inspectors should understand that, while working for the Federal Aviation Administration (FAA), their every action represents the U.S. Government. The FAA expects IFO employees to be fully aware that they are guests in a foreign country and they should recognize national culture within their working environment. The FAA expects IFO inspectors to observe the above guidance during all phases of the certification/renewal/amendment process.

2-1329 OBJECTIVE. This section contains additional requirements for certification/renewal/amendment, national certification, line station authorization surveillance, and geographic authorizations of a part 145 repair station located outside the United States in a country without a Bilateral Aviation Safety Agreement (BASA) with Maintenance Implementation Procedures (MIP) with the United States (Peer Group G).

2-1330 PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites:

- Knowledge of the regulatory requirements of part 145 and completion of FAA Course 21058, Certification and Surveillance of Part 145 Repair Stations.
- Successful completion of the Airworthiness Inspector Indoctrination course(s) or equivalent.
- Previous experience with certification or surveillance of part 145 repair stations.

B. Coordination. This task requires coordination between Maintenance and Avionics ASIs. Additionally, the Safety Standards office and IFO coordination may be required.

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2-1331 REFERENCES, FORMS, AND JOB AIDS.

A. References (current editions):

- Title 14 CFR Parts 43 and 145.
- Advisory Circular (AC) 187-1, Flight Standards Service Schedule of Charges Outside the United States.
- FAA Order 8130.2, Airworthiness Certification of Aircraft.
- FAA Order 8130.21, Procedures for Completion and Use of the Authorized Release Certificate, FAA Form 8130-3, Airworthiness Approval Tag.
- Volume 2, Chapter 11, Sections 1 thru 6, and 13.
- Volume 10, Safety Assurance System Policy and Procedures.
- Volume 12, Chapter 14, Section 1, Policy.
- Volume 14, Chapter 1, Section 2, Flight Standards Service Compliance Action Decision Procedure.
- The applicable Maintenance Agreement Guidance (MAG).

B. Forms:

- FAA Form 8000-4, Air Agency Certificate.
- FAA Form 8000-4-1, Repair Station Operations Specifications.
- FAA Form 8130-3, Authorized Release Certificate, Airworthiness Approval Tag.
- FAA Form 8310-3, Application for Repair Station Certificate and/or Rating.
- FAA Form 8400-6, Preapplication Statement of Intent.
- MAG applicable forms.

C. Job Aids. For the Certification Job Aid and the Schedule of Events (SOE), see Volume 2, Chapter 11, Section 1, Figure 2-86, Five Phases of Certification and Requirements of the Gate System for Part 145; and Figure 2-87, Schedule of Events for Part 145 Repair Stations.

2-1332 INITIAL CERTIFICATION—PREAPPLICATION PHASE 1 AND FORMAL APPLICATION PHASE 2.

A. General. This section provides the IFOs with additional requirements when they perform an initial certification of part 145 repair stations located outside the United States. Certificates for repair stations located outside the United States have a limited duration. Initial certification is limited to 12 months from the date the certificate is issued. Thereafter, the FAA will renew the certificate or rating for a 24-month period if the repair station has operated per the applicable requirements of part 145 within the preceding period.

B. Perceived Need. Part 145, § 145.51(c)(1) requires that the applicant show the necessity for a part 145 Air Agency Certificate and rating(s). The applicant must have a current or future operational or economic need (a perceived need) for the maintenance, preventive maintenance, or alteration of aeronautical articles subject to FAA regulatory oversight. The applicant can express this perceived need by including a statement from an operator of a U.S.-registered aircraft; a foreign-registered aircraft operated under the provisions of 14 CFR

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part 121 or part 135; a company that maintains or alters articles to be installed on U.S.-registered aircraft, indicating that the repair station's services are required; or documentation from a leasing company or supplier/distributor showing that the applicant's services are necessary, provided the applicant can confirm in writing that the leasing company or supplier/distributor is doing business with operators of U.S.-registered aircraft.

C. Fees. The applicant must show that the fee prescribed by 14 CFR part 187 has been paid. For fee collection for air agency actions, the IFO should follow the guidance in Volume 12, Chapter 13, Section 1, paragraph 12-689, Fee Collection. The certificate holder should deposit the fee per part 187, IFO procedures, AFS-001-000-W2, and AC 187-1. However, during the certification phase, the inspector will confirm that the appropriate FAA fee has been paid in full per part 187 and AC 187-1.

D. Personnel Certification. The personnel certification requirements of 14 CFR part 65 do not apply to supervisors or personnel authorized to return an article for return to service in repair stations located outside the United States. However, they must ensure the personnel:

1) Have been trained in or have 18 months practical experience with the methods, techniques, practices, aids, equipment, and tools used to perform the maintenance, preventive maintenance, or alterations; and

2) Are thoroughly familiar with the applicable regulations and proficient in the use of the various inspection methods, techniques, practices, aids, equipment, and tools appropriate for the work being performed and approved or returned to service. The FAA reserves the right to interview the applicant's supervisors, inspectors, and/or personnel responsible for final approval for return to service.

NOTE: The FAA may accept the personnel certification requirements in the country where the repair station is located, provided the English language requirements are met.

E. English Language Requirements for Technical Data. The FAA recognizes the national language of the country where the repair station is located. The repair station may convert technical data, such as operators' instructions for continued airworthiness (ICA), manufacturers' maintenance manuals, or type certificate holders' (TCH) continuous airworthiness data, into the national language. The repair station may also convert internal documents, such as workcards, worksheets, and shop travelers.

NOTE: The repair station must establish procedures in its Repair Station Manual (RSM) that ensure that its English language copies of technical data, and any internal documents developed from this technical data, are current and complete. The main base of the repair station should retain the English language copy of the technical data. The repair station must make the data available to the FAA upon request.

F. National Certification. FAA policy requires the FAA to advise the country's AA of FAA certification. The FAA need not obtain AA concurrence, but the FAA will take under consideration any safety information related to the applicant. Section 145.53(a) states, in part,

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"A person who meets the requirements…of this part is entitled to a repair station certificate." The FAA will request a copy of the applicant's Air Agency Certificate and limitations document. Some countries might not issue repair station certification, and in such instances, part 145 enables the FAA to issue a certificate.

G. Geographic Authorization. A geographic authorization is an approval provided to an airframe-rated facility located outside the United States to perform maintenance under contract for a U.S. air carrier or for an operator of U.S.-registered aircraft under 14 CFR part 129 at a location outside the country where the repair station is located. The FAA issues a geographic authorization (operations specification (OpSpec) B050) to respond to the maintenance needs of a U.S. air carrier, or of part 129 operators.

NOTE: The FAA normally does not issue this authorization during an initial certification.

2-1333 INITIAL CERTIFICATION—ADMINISTRATIVE PHASE 5.

A. Processing and Payment of Fees.

1) The IFO will notify the Approved Maintenance Organization (AMO), in writing, of the fee for processing the part 145 certificate. AC 187-1 establishes these fees. The AMO will send this fee in accordance with the IFO's prescribed procedures.

2) Refer to AC 187-1 for applicable fees.

3) The IFO will issue a certificate and OpSpecs only after it receives payment of the prescribed fee. The IFO may grant additional time for the payment of fees.

B. Prepare the Air Agency Certificate. When the applicant has met all regulatory requirements, the principal inspector (PI) will prepare the Air Agency Certificate in accordance with Volume 2, Chapter 11, Section 5. For repair stations located outside the United States, you will also include the following:

1) Insert the expiration date after the statement "This certificate unless canceled, suspended, or revoked, shall continue in effect." The renewal of a repair station located outside the United States should be issued for an initial certification period of 12 months. Thereafter, the FAA may renew the certificate for a 24-month period from the date of renewal (refer to § 145.55), unless coordinated through the International Field Management Branch (AFS-54).

2) At the very bottom of the certificate, strike out the last line referring to "Any alteration of this certificate."

C. Certification Report. In addition to the items that compose the certification as contained in Volume 2, Chapter 11, Section 5, include the following:

1) The document identifying the need or perceived need.

2) Proof of fee paid for the certification.

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2-1334 INITIAL CERTIFICATION—TASK OUTCOMES.

A. Responsibilities for SAS Custom Data Collection Tool (C DCT) and Vitals Information Entries. The inspector will:

1) Follow the certification process in Volume 10.

2) Complete the appropriate SAS C DCT, as required.

B. Complete the Task. Completion of the certification task will result in the following:

1) Document in the Vitals Information tab the initial certification date.

2) Issuance of the Air Agency Certificate and required OpSpecs authorizations.

3) Notification to the Transportation Security Administration (TSA) per Volume 2, Chapter 11, Section 13, when the FAA part 145 certification and Air Agency Certificate has been issued.

4) Retain the original certification report in the IFO office file.

5) Letter to the AA of the country where the repair station is located, advising it that the FAA certificate and OpSpecs have been issued. The letter should also request that the air agency advise the IFO anytime the AA takes certificate action or identifies serious concerns against that repair station.

6) Letter to the applicant indicating the IFO denied the issuance of the certificate, if applicable.

7) Letter to the applicant confirming termination of the certification process, if applicable.

2-1335 RENEWAL OF THE CERTIFICATE.

A. Renewal Timeframe. A repair station located outside the United States must renew its certificate 12 months after its initial certification, and thereafter no more than 24 months from the date of its last renewal.

NOTE: Although the regulation indicates a 24-month renewal period, inspectors must perform annual surveillance of repair stations, per current policy.

B. Application Submission Timeframe. The repair station must submit a new application 30 days before the expiration date of its certificate.

C. IFO. The IFO must track renewal dates to establish an effective yearly work program.

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2-1336 RENEWAL—DESIGN ASSESSMENT PHASE 3.

A. Documents. ASIs should ensure that all documents for the formal application package have been submitted and are complete. Verify the inclusion of:

1) Completed FAA Form 8310-3.

2) A document showing there is a continuing need for the repair station to maintain U.S.-registered aircraft or articles.

3) A list of contractors, if changes have been made to the list since the repair station's last renewal. A copy of those changes must be included in the package.

4) The RSM/Quality Control Manual (QCM), if either of the manuals has been revised since the repair station's last renewal. A copy of the revision must be provided with the application package.

B. Application Package. Review the content of each submitted document for regulatory compliance. The documents to be reviewed include:

1) The completed FAA Form 8310-3.

2) A document showing the repair station meets the continuing need requirement of § 145.51(c)(1).

a) Repair stations located outside the United States must continue to show that their certificate is necessary to maintain U.S. aircraft or articles as required by § 145.51(c). The purpose for this requirement is to not burden the FAA's resources in certificating and recertification of such repair stations if they are not going to be supporting U.S.-registered aircraft and products. Implicit is the concern over expending those FAA resources in surveillance of such repair stations. However, some flexibility is necessary in implementing this policy, and it must not be applied arbitrarily.

NOTE: The Assistant Chief Counsel for the Regulations Division (AGC-200) provided a legal interpretation of §§ 145.51(c) and 145.55(b) concerning the showing of need by a foreign repair station. The full text of the memorandum, dated December 9, 2008, is available at: https://www.faa.gov/about/office_org/headquarters_offices/agc/practice_areas/regulations/interpretations/data/interps/2008/manager-sf-wp-03%20-%20(2008)%20legal%20interpretation.pdf.

b) If the repair station cannot establish continuing need, the FAA will renew the repair station certificate based on the repair station's previous continuing need statement. However, the FAA will advise the repair station in writing that if the repair station is still unable to show a continuing need at the time of its next renewal, the FAA may not renew the certificate.

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c) A renewal applicant does not have to submit an activity report for each article for which it is rated. A single document indicating that minor or no changes were made to its customer list will satisfy the need requirements. The need can be verified during the inspection phase.

3) The repair station's list of maintenance functions contracted to another entity, if changes have been made. Refer to § 145.217 and Volume 2, Chapter 11, Sections 1 and 5, for additional information.

C. Review the RSM/QCM or Section. If revisions are made to these manuals, the revisions should be reviewed as they are submitted. In some cases, a repair station may elect to revise its manuals for its certificate renewal. Regardless of when they are submitted, the FAA must accept these revisions. The revision's inclusion should not delay the renewal process. The FAA may elect to review the revisions and accept or reject them after the certificate renewal has been completed based on the old manuals. Acceptance of the revision must be accomplished per Volume 6, Chapter 9, Section 7.

NOTE: Repair stations do not need to wait until the IFO accepts revisions to implement them. However, if the FAA finds a revision unacceptable, the repair station must have a procedure in place that describes how articles returned to service will be addressed.

D. Document Any Deficiencies. Conduct a thorough and comprehensive review of all documents. If deficiencies are found in any document, return it to the applicant with a letter outlining the deficient areas. Inform the applicant that the certification process will not continue until all deficiencies are resolved or a corrective action plan (CAP) is agreed upon. The applicant must provide the FAA with a written response with an approximate date by which the applicant will correct the errors and resubmit the document. The inspector's letter to the applicant must be as clear and complete as possible to avoid causing delays from documents being mailed back and forth without resolving issues.

E. Review CAP. Continue with the renewal process if the repair station provides a CAP that satisfies the requirements of the application package.

1) If the applicant fails to submit a CAP or correct the deficiencies within the specified time agreed to between them and the FAA, the FAA will terminate the application for renewal.

2) If the FAA finds the written CAP acceptable, or if the applicant has corrected the deficiencies, it may continue renewing the repair station certificate. See subparagraph 2-1337D1).

3) If a CAP exists from the previous year's inspection/renewal, the PI must review that plan. During the demonstration and inspection phase of the renewal, the PI must verify that those deficiencies/findings have been corrected.

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2-1337 RENEWAL—PERFORMANCE ASSESSMENT PHASE 4.

A. Renewal Procedures. When performing a certificate renewal inspection, follow the facility inspection procedures identified in Volume 6, Chapter 9, Section 20. Additionally, use the applicable System or Subsystem Performance Data Collection Tool (SP DCT).

B. Line Station Authorization Surveillance. A repair station must conduct a quality control (QC) system audit to ensure compliance with its QC procedures. The ASI should review the audits of line stations to ensure the repair station has visited each of its line stations once per year. The QC audit should provide a report for each line station showing which station the inspector audited, the date of the audit, what the inspector audited, and findings and corrective action identified during the audit. Once a year, the ASI should perform a physical inspection of a minimum 10 percent sampling of line stations to confirm the effectiveness of the repair station's QC procedures.

NOTE: Line stations outside the geographic boundary of the country where the certificated facility is located will not receive a line station authorization. An authorization request for line stations outside these boundaries must follow the geographic authorization process. See Volume 2, Chapter 11, Section 8, paragraphs 2-1286 through 2-1292.

C. Geographic Authorization Surveillance. A geographic authorization may be issued to a repair station outside the United States to maintain U.S.-registered aircraft outside the country where the repair station certificate is held (see Volume 3, Chapter 18, Section 10).

1) A repair station QC system is required to audit its geographic authorization location annually to ensure compliance with the RSM and QC procedures. The ASI should review the audits to ensure compliance with the repair station's accepted manuals.

2) The ASI should coordinate surveillance of the geographic authorization with other IFOs and the air carrier CHDO to conduct risk-based sampling inspections, reduce the possibility of duplicate surveillance, and increase efficient use of resources.

3) The inspector should coordinate surveillance of a geographic authorization with the U.S. air carrier certificate management office (CMO) to reduce the possibility of duplicate surveillance and increase the efficient use of resources.

D. Findings/Deficiencies. Due to the distance, travel, expense, and short timeframe requirements associated with repair stations located outside the United States, the inspector should apply the following policy regarding deficiencies/findings noted during the document review and inspection phases:

1) If the FAA discovers deficiencies in document review and inspection phase for renewal or after conducting an inspection (surveillance), the FAA may allow the applicant sufficient time after notification to correct the deficiencies or to submit a CAP, depending on the nature of the deficiencies.

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2) Once the applicant has submitted the CAP and prior to acceptance of the plan, the PI will review it and ensure it meets the following requirements:

a) The timeframe for correcting the deficiencies/findings must be 90 days or less.

b) The correction plan must adequately address the deficiencies/findings.

c) The plan must require the applicant to advise the PI in writing when the deficiencies/findings have been corrected.

d) The plan must also contain a procedure for the repair station to validate the process/procedure used to correct the deficiencies/findings. This validation should take place within 90 days or less after the correction was implemented.

3) If the FAA finds the written CAP acceptable, it may renew the repair station certificate.

4) If the part 145 repair station certificate expires either during the time between inspections or due to unusual circumstances, the FAA may need to issue a short-term certificate of up to 90 days if the applicant demonstrates an ability and willingness to correct the noted deficiencies. The FAA may not extend the certificate past the 24-month period.

5) Depending on the nature of the deficiencies, the FAA may amend the repair station's ratings. In any of the above situations, after the FAA is satisfied with all corrective action, it will reissue the certificate using the original renewal date. The repair station should not gain renewal time or an advantage by having additional time allowed for the correction of deficiencies.

2-1338 RENEWAL—ADMINISTRATIVE PHASE 5.

A. Fees for Processing.

1) The IFO will notify the AMO, in writing, of the fee for processing the part 145 certificate. AC 187-1 establishes these fees. The AMO will send this fee in accordance with the IFO's prescribed procedures. The IFO should also follow Volume 12, Chapter 13, Section 1.

2) Verify that the fees have been paid in full. Deposit the fee per part 187 and IFO procedures. It is permissible to issue a renewal certificate pending receipt of the fee. Due to normal corporate accounting practices, it may take a few weeks before the fee is transmitted.

NOTE: All activities associated with surveillance related to a repair station certificate are chargeable as FAA fees per part 187. Calculate all fees per AC 187-1.

a) If the IFO does not receive the fee within a reasonable period of time, it should advise the repair station in writing that certificate action may be required if the fee is not transmitted as soon as possible.

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b) The IFO should establish office policy regarding timeframes and procedures for fee payments. The IFO should be familiar with local mail and electronic transaction timeframes.

B. Prepare the Air Agency Certificate. When the applicant has met all regulatory requirements, the PI will prepare the Air Agency Certificate in accordance with Volume 2, Chapter 11, Section 5. For repair stations located outside the United States you will also include the following:

1) Insert the expiration date after the statement "This certificate unless canceled, suspended, or revoked, shall continue in effect." The renewal of a repair station located outside the United States should be issued for an initial certification period of 12 months. Thereafter, the FAA will renew the certificate for a 24-month period from the date of renewal (refer to § 145.55) unless coordinated through AFS-54.

2) At the very bottom of the certificate strike out the last line referring to "Any alteration of this certificate."

3) The IFO will issue a certificate and OpSpecs only after it receives payment of the prescribed fee. The IFO may grant additional time for the payment of fees.

C. Certification Report. In addition to the items that compose the certification as contained in Volume 2, Chapter 11, Section 5, include the following:

1) A document identifying the need or perceived need.

2) The proof of fee paid for the certification.

2-1339 RENEWAL—TASK OUTCOMES.

A. Responsibilities for SAS C DCT and Vitals Information Entries. The inspector will:

1) Complete the appropriate SAS C DCT as required.

2) Update the SAS Configuration Module 1 Vitals Information.

3) Document in the Vitals Information the renewal inspection date.

B. Complete the Task. Completion of the certification task will result in the following:

1) Issuance of an Air Agency Certificate and OpSpecs.

2) Send a letter to:

a) The AA of the country where the repair station is located, advising it that the FAA certificate and OpSpecs have been issued; the letter should also request that the AA advise the IFO anytime they take certificate action or identify serious concerns against that repair station; or

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b) The applicant, indicating the IFO denied the issuance of the certificate, as applicable; or

c) The applicant, confirming termination of the certification process, as applicable.

3) Retain the original certification report in the IFO.

2-1340 RENEWAL—FUTURE ACTIVITIES. The IFO must ensure an orderly transition from the certification process to certificate management. The ASI should perform followup inspections and surveillance inspections, as required.

2-1341 AMENDMENT TO OR TRANSFER OF CERTIFICATE.

A. New Application. Section 145.57 requires that a repair station submit a new application in the following situations:

1) The holder of a repair station certificate must apply for a change to its certificate if it changes the location of the repair station, or requests adding or amending a rating. The repair station certificate holder must notify the FAA in advance and the FAA may prescribe conditions that the repair station must follow when moving to a new address or location.

2) If the holder of the repair station certificate sells or transfers its assets, the new owner must apply for an amended certificate in accordance with § 145.51. On occasion, repair station ownership changes without changing the facilities and personnel. An example of this type of change would be a stock transfer or a monetary takeover that does not change or affect the location, tools, equipment, or management personnel.

NOTE: ASIs should contact their regional general counsel office when asked questions concerning whether limited liability corporations or changes in stockholder ownership constitute a transfer of repair station assets.

3) If the repair station and/or its contractors or subcontractors are performing a job function concerning transportation of hazardous materials (hazmat), the repair station must train its employees to the International Civil Aviation Organization's (ICAO) hazmat standards. The repair station must also provide the FAA with a letter certifying that the appropriate employees have been trained to the ICAO standard, as described in Volume 2, Chapter 11, Section 1, subparagraph 2-1190E, Hazmat, unless the letter is already in the repair station certification file.

B. Certificate Number. The inspector should recommend a new certificate number, due to the Freedom of Information Act (FOIA) and liability issues. ASIs should inform prospective owners that they might be held liable for work performed under previous management. To retain the old number, new owners must stipulate in writing that they clearly understand the potential for release of information under the FOIA when retaining the old certificate number.

2-1342 AMENDMENT—APPLICATION—ADDING AN ADDITIONAL RATING. The ASI should follow the initial certification procedures in Volume 2, Chapter 11, Section 7.

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A. Preapplication Statement of Intent (PASI). A PASI is not required for a change or amendment to a certificate.

1) An application meeting is not required for amending a Repair Station Certificate.

2) The repair station must submit a completed application (FAA Form 8310-3).

3) The repair station must submit a revised letter of compliance that covers the additional ratings.

B. Change to Facility or Address Change.

1) The repair station must submit a new application when a change to the facility affects the repair station certificate. Examples of facility changes include adding additional space or reducing the size of the facility.

2) The repair station must submit a new application prior to moving to a new facility or changing its address. The FAA will review the application and may authorize continued work while the applicant moves to another facility.

C. Change in Ownership. When a repair station sells or transfers ownership of its organization, the new owner must submit a new application.

1) If the sale or transfer of ownership, normally called a financial takeover, does not affect the employees, facilities, equipment, or daily operation of the repair station, only a new application is required.

2) An applicant must submit a new application and manuals for an ownership change that affects the repair station's daily operation, such as a management change or a facility or equipment change. The application process is the same as for a new application. (See paragraphs 2-1332 through 2-1334, for initial certification procedures.) However, applicants may continue to operate under the existing certificate while the FAA processes the new certification package, unless the ASI and the appropriate Flight Standards District Office (FSDO) determine that a safety concern prohibits continued operation.

2-1343 AMENDMENT—GEOGRAPHIC AUTHORIZATION.

A. Criteria for Issuing Geographic Authorization. Geographic authorization is different from work away from the station or line station maintenance authorization. The repair station must fulfill the criteria listed below. The ASI should ensure that:

1) The repair station has an airframe rating for the make/model/series of the complete aircraft, such as a Boeing 777-300.

2) The make/model/series aircraft is operating into the requested location. The aircraft being operated into the requested location need not be the aircraft with a part 129 authorization.

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3) The FAA will not issue a geographic authorization at a location where an appropriately rated repair station already exists, unless the U.S. operator shows why the additional geographic authorization is necessary. For example, legitimate reasons for issuing the rating may be that locally rated repair stations cannot meet operator schedules or cannot deal with additional workload.

4) Each geographic authorization is included in the repair station's internal self-evaluation program. The program must include an annual evaluation and report of each geographic authorization location. This report must be made available to the FAA on request.

NOTE: Geographic authorization may not be issued to a location within the United States and its territories. The FAA has determined that ample certificated repair stations (CRS) are located within the United States to provide service. The intent of a geographic authorization is to give U.S. operators and foreign operators holding a part 129, § 129.14 authorization the ability to meet the requirements of their maintenance programs in locations where appropriately rated FAA-certificated repair stations are not available.

B. Geographic Authorization Procedures. The IFO will:

1) Receive notice of the air carrier's need. The process starts when the air carrier notifies its CHDO that it needs the services of a repair station at a location where a geographic authorization is required for the repair station.

NOTE: An operator under § 129.14 will use the IFO that issued the § 129.14 authorizations.

2) Receive a letter from the repair station requesting geographic authorization. The letter should explain how the repair station will meet the criteria in subparagraph 2-1343A, and include a copy of the RSM procedures section addressing geographic authorizations and responsibilities.

3) When eligibility for geographic authorization is established, coordinate closely with the air carrier CHDO to ensure that duplicate efforts do not occur.

NOTE: Certification and surveillance of geographic authorization is the responsibility of the IFO. However, this does not relieve the CHDO of its responsibilities for surveillance of the air carrier's adherence to part 121, § 121.369. The CHDO's coordination with IFOs outside the United States is an efficient method of surveillance of air carrier operations in areas normally requiring the CHDO to use resources better used in other areas. Geographic authorization is limited to line-maintenance-type operations.

4) Receive a copy of the contract from the air carrier's CHDO. Communicate and discuss with the air carrier's CHDO about the request, type of aircraft, location, and air carrier's procedures; and ensure the CHDO does not have any technical objections to the request for geographic authorization at this location.

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5) Provide the CHDO with a copy of the repair station's commitment to meet subparagraph 2-1343A criteria.

6) Receive a copy of the repair station's self-evaluation report, if applicable. If this is an initial or an added geographic authorization location, the repair station must give the FAA a copy of its self-evaluation report, in which it expresses its ability to function at the requested location.

7) Review the self-evaluation report to ensure that the repair station has trained personnel, tooling, equipment, manuals, and inspection processes to support the requested geographic authorization.

8) Review the training documentation from the air carrier indicating all required training for the repair station's personnel is complete. (If not complete, request an estimated time of completion). The air carrier must: authorize the repair station and its employees to perform maintenance, accept the repair station training, deliver air carrier training, or any other qualifications that must be completed.

9) Revise repair station OpSpec B050 to include the initial or new geographic authorization location. The OpSpec must list each authorization by location address, make, and model of aircraft. Additionally, list the air carrier customer name and the section of its appropriate air carrier manual by which maintenance will be performed.

10) On an initial geographic authorization, revise the repair station certificate to list the geographic authorization directly below the airframe rating.

11) Forward the revised certificate and OpSpecs to the repair station and send a copy to the CHDO.

NOTE: Do not delay sending a copy of the revised certificate and OpSpecs to the repair station. Delays may adversely affect air carriers meeting their operational schedules.

C. Surveillance Requirement for Geographic Authorization.

1) It is not necessary for the IFO or the CHDO to conduct onsite surveillance for a request to add a new location if the repair station provided a self-evaluation report. A repair station may add an additional location without further showing.

2) When conducting repair station certificate renewal or off-year surveillance, the ASI must review the repair station's geographic authorization self-evaluation reports to ensure that the FAA has evaluated the report for each location within the previous year.

3) The IFO must establish an office policy requiring inspectors performing surveillance in a city or country to visit the locations where a repair station has a geographic authorization, provided the visit does not require additional travel within the country or create expenditure of added travel resources. This means the inspector must travel to the locations using

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ground transportation and must complete the visit within their normal workday, unless otherwise authorized by their supervisor.

4) Forward an explanation of the fees to the repair station's ASI for inclusion in the repair station certificate's renewal cost, which include all times and costs associated with surveillance of a geographic authorization.

5) A CHDO may not charge the repair station for any surveillance of geographic authorization it performs as part of its air carrier surveillance.

6) Close coordination must occur between the CHDO, the IFO where the geographic authorization is located, and the certificate holder's IFO to reduce the possibility of multiple surveillance activities. All findings associated with a geographic authorization must be coordinated between offices involved with the geographic location.

7) The IFO that retains the repair station certificate is also responsible for compliance and/or enforcement activity. It must communicate findings with the air carrier CHDO. Any additional compliance and/or enforcement action relating to the air carrier is the responsibility of the air carrier CHDO.

2-1344 AMENDMENT—APPLICATION PHASE. Repair stations adding ratings or changes to a certificate will use the same process as renewal of a certificate discussed in paragraphs 2-1335 through 2-1339, but must also include:

- A copy of FAA Form 8310-3, including a list of functions that the applicant intends to contract to another facility;
- A revised letter of compliance that addresses the items changed, such as added rating or address change;
- A document showing the need for the certificate, as described in subparagraph 2-1332B; and
- If applicable, a revised letter certifying employees have been trained to ICAO hazmat standards, as described in Volume 2, Chapter 11, Section 1, subparagraph 2-1190E.

2-1345 AMENDMENT—DESIGN ASSESSMENT PHASE. Follow the same renewal process as indicated in paragraphs 2-1336 through 2-1339. The ASI should review any manual revision required by the application for an added rating or change to the certificate for compliance with part 145. Repair stations should process manual revisions and documentation findings as discussed in paragraph 2-1332.

2-1346 AMENDMENT—PERFORMANCE ASSESSMENT PHASE. This phase should follow the same requirements as indicated in paragraphs 2-1332 through 2-1334, as appropriate to the requested change to the repair station certificate and OpSpecs.

2-1347 AMENDMENT—ADMINISTRATIVE PHASE. Amendments to a repair station certificate and OpSpecs must be accomplished as indicated in this section and must reflect the applicant's requested change.

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2-1348 AMENDMENT—TASK OUTCOMES. This should follow the same requirements as indicated in paragraphs 2-1332 through 2-1334, as appropriate.

2-1349 AMENDMENT—FUTURE ACTIVITIES. The IFO must ensure that an orderly transition occurs from the certification process to continued oversight surveillance. Perform followup inspection and surveillance inspections, as required by the SAS oversight process.

RESERVED. Paragraphs 2-1350 through 2-1354.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 19 TRAINING PROGRAMS AND AIRMAN QUALIFICATIONS

Section 5 Safety Assurance System: Flightcrew Aircraft Ground Training Curriculum Segments

Source Basis:

- **Section 121.400, Applicability and Terms Used.**
- **Section 121.401, Training Program: General.**
- **Section 121.403, Training Program: Curriculum.**
- **Section 121.405, Training Program and Revision: Initial and Final Approval.**
- **Section 121.415, Crewmember and Dispatcher Training Program Requirements.**
- **Section 121.417, Crewmember Emergency Training.**
- **Section 121.418, Differences Training and Related Aircraft Differences Training.**
- **Section 121.419, Pilots and Flight Engineers: Initial, Transition, and Upgrade Ground Training.**
- **Section 121.427, Recurrent Training.**
- **Section 121.431, Applicability.**
- **Section 121.433, Training Required.**
- **Section 135.321, Applicability and Terms Used.**
- **Section 135.323, Training Program: General.**
- **Section 135.325, Training Program and Revision: Initial and Final Approval.**
- **Section 135.327, Training Program: Curriculum.**
- **Section 135.329, Crewmember Training Requirements.**
- **Section 135.330, Crew Resource Management Training.**
- **Section 135.331, Crewmember Emergency Training.**
- **Section 135.341, Pilot and Flight Attendant Crewmember Training Programs.**
- **Section 135.343, Crewmember Initial and Recurrent Training Requirements.**
- **Section 135.345, Pilots: Initial, Transition, and Upgrade Ground Training.**
- **Section 135.351, Recurrent Training.**

3-1196 GENERAL. This section specifies the objectives of aircraft ground training. Structure and content of flightcrew aircraft ground training curriculum segments are discussed. Also, three distinct areas of aircraft ground training are identified: general operational subjects, aircraft systems, and systems integration training. This section is related to Safety Assurance System (SAS) Element 2.1.1 (OP) Training of Flight Crew Members.

3-1197 AIRCRAFT GROUND TRAINING OBJECTIVES. The primary objective of aircraft ground training is to provide flightcrew members with the necessary knowledge for understanding the basic functions of aircraft systems, the use of the individual system components, the integration of aircraft systems, and operational procedures. An important requirement of an aircraft ground training curriculum segment is that, upon completion, a student will be sufficiently prepared to enter the flight training curriculum segment. Aircraft ground training, as used in this section, is training for a specific aircraft type. Aircraft ground training may be conducted using many methods, including classroom instruction, ground training devices

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(GTD), computer-based instruction (CBI), flight simulation training devices (FSTD), and static aircraft.

3-1198 AIRCRAFT GROUND TRAINING CURRICULUM SEGMENTS. Pilots and Flight Engineers (FE) must successfully complete an aircraft ground training curriculum segment for the appropriate category of training (initial new-hire, initial equipment, transition, upgrade, recurrent, or requalification training). Each aircraft ground training curriculum segment consists of training modules containing pertinent subject matter appropriate to the category of training. Training modules may be designed to be used interchangeably in the various categories of training. For example, a hydraulic system training module could be used in initial new-hire, initial equipment, and transition training.

3-1199 AIRCRAFT GROUND TRAINING MODULES.

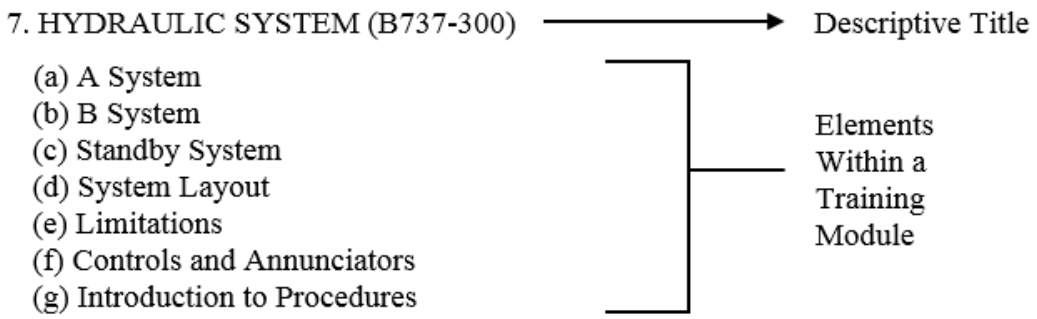
A. Module Outline. An aircraft ground training curriculum segment must include as many training modules as necessary for appropriate training to occur. Each module outline must provide at least:

1) A descriptive title of the training module.

2) A list of the related elements or events that will be presented during instruction on the module.

B. Module Contents. The training module outline must contain sufficient elements or events to ensure that a student will receive training on the main features of individual systems, the operation of individual systems, and the integration of those systems with other aircraft systems. It is unnecessary to include detailed descriptions of each element within a training module outline. However, such detailed descriptions are appropriate and should be included in the operator's courseware. During the approval process, a principal operations inspector (POI) should review courseware as necessary to ensure that the scope and depth of the training modules are adequate. The following example illustrates one of the many acceptable methods of presenting an aircraft ground training module outline:

Figure 3-176. Aircraft Ground Training Module Outline Example



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C. Scope and Depth of Training Modules. The job aid at the end of this section (see Table 3-55, Aircraft Ground Training Module Job Aid) is provided to assist inspectors when determining whether the scope and depth of the aircraft ground training modules are acceptable. The following example illustrates the interrelationship of curriculum segments and training module outlines:

Figure 3-177. Interrelationship of a Ground Curriculum Segment and Training Modules

II. PIC BAe-146 INITIAL EQUIPMENT GROUND TRAINING → Title of Curriculum Segment

A. Objective of Training: → Objective Statement

B. General Operational Subjects:

C. Aircraft Systems:

Subject Area Titles

1. Aircraft General, Equipment and Furnishings, Emergency Equipment
2. Fire and Overheat Protection, Warning Systems, Lighting
3. Powerplants, APU
4. Electrical System
5. Pneumatic System, Air Conditioning, and Pressurization
6. Ice and Rain Protection, Oxygen System
7. Hydraulic System
8. Landing Gear and Brake System
9. Flight Controls
10. Fuel System
11. Navigation System
12. Flight Instruments, Communication Equipment
13. Review
14. Written Exam

Training Modules Within a Curriculum Segment

7. HYDRAULIC SYSTEM TRAINING MODULE → Descriptive Title

(a) Yellow System
(b) Green System
(c) Standby System
(d) System Layout
(e) Limitations
(f) Controls and Annunciators
(g) Introduction to Procedures

Elements Within a Training Module

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3-1200 TRAINING HOURS. The number of training hours must be specified on all aircraft ground training curriculum segment outlines. It is difficult to provide guidance on acceptable training hours for aircraft ground training curriculum segments because of the various situations that can be encountered. POIs must thoroughly study the operator's proposals. Based on experience with the operator, past experiences with other operators, and their own training experiences, POIs must use reasonable judgment when determining whether the training can be adequately accomplished within the training hours specified in the curriculum segment. Certain training methods, such as CBI, allow students to progress through training at a rate that depends on each individual student's ability to assimilate the required knowledge or abilities. For these kinds of training methods, the specified training hours should be indicative of the time an average student will progress through training.

A. Ground Training Hours Norms. Table 3-52, Flightcrew Aircraft Ground Training Hours National Norms (Thresholds), provides direction and guidance for determining acceptable training hours for aircraft ground training curriculum segments. Generally, training hours listed in this table approximate training days or fractions of days. Periods for reasonable breaks during instruction are included in these training hours. The table provides two sets of training hours for the various categories of training and families of aircraft.

1) The first set is considered to be the national norm and reasonable training support is presumed, such as proficient instructors, well-organized courseware, and modern training devices or aids. The national norm must not be construed as being always acceptable. When determining the adequacy of training hours, a POI should use the national norm as a point from which other factors shall be weighed. There may be many reasons why the training hours need to be greater than the national norm. The operator may need to specify more hours because of the complexity of the aircraft or types of operation. A POI may need to require more hours because of inadequate training support. Conversely, training hours less than the national norm may be fully acceptable due to the use of highly sophisticated and modern training methods, the use of less complex aircraft, or the use of a less complex type of operation.

2) The second set of training hours, in parentheses, is an established threshold for training hours. Threshold training hours are established for particular categories of training and families of aircraft. Before granting initial approval to a curriculum segment with less than the established threshold training hours, a POI must ensure that the training to be given provides sufficient training and meets the objective of the curriculum segment.

B. Upgrade Ground Training. Training hour national norms have not been established for upgrade ground training curriculum segments. Upgrade ground training requirements vary widely depending on a flightcrew member's experience, previous duty position, and currency status in the aircraft for which training is being conducted. In cases when students have not served on the aircraft for a long time, upgrade ground training may need to be as extensive as initial equipment training. In other cases when students are currently qualified on the aircraft, either as FEs or seconds in command (SIC), the upgrade ground training may only be that training necessary to qualify them in the new duty position. In such cases, an operator may be able to expand or conduct upgrade flight training and qualify students for the new duty positions without a separate upgrade ground training curriculum segment.

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1) The following illustration provides several factors to be considered when evaluating upgrade ground training curriculum segments:

Table 3-51. Factors of Upgrade Ground Training

UPGRADE GROUND TRAINING			
FLIGHTCREW MEMBER STATUS	**GENERAL OPERATIONAL SUBJECTS**	**AIRCRAFT SYSTEMS**	**SYSTEMS INTEGRATION**
Second in command (SIC) (current on aircraft) upgrade to pilot in command (PIC)	Training modules or elements pertaining to PIC duty position	May not be needed	Training modules or elements pertaining to PIC duty position
SIC (NOT current on aircraft) upgrade to PIC	Training modules or elements pertaining to PIC duty position	Appropriate training modules depending on time NOT current	Appropriate training modules depending on time NOT current
Flight Engineer (FE) (current on aircraft) upgrade to SIC	Training modules pertaining to SIC duty position	May not be needed	Training modules or elements pertaining to SIC duty position
FE (NOT current on aircraft) upgrade to SIC	Training modules or elements pertaining to SIC duty position	Appropriate training modules depending on time NOT current	Appropriate training modules depending on time NOT current

2) Training hour thresholds for upgrade ground training curriculum segments have been established. For Title 14 of the Code of Federal Regulations (14 CFR) part 121, if the approved training hours are below the threshold training hours in Table 3-52, the POI must notify the Air Transportation Division (AFS-200) by memo. The memo must describe the reasons and actions resulting in the approval and include a copy of the approved aircraft ground training curriculum segment outline and any additional supporting information submitted by the air carrier. This AFS-200 notification is necessary for tracking and standardization purposes.

C. Related Aircraft Differences Training. Training hour national norms and thresholds have not been established for related aircraft differences ground training curriculum segments. The training hours required for designated related aircraft will vary based on the training methods and level of differences specified in the Flight Standardization Board (FSB) report. (See Volume 3, Chapter 19, Section 12 for additional information regarding related aircraft designation and related aircraft differences training.)

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Table 3-52. Flightcrew Aircraft Ground Training Hours National Norms (Thresholds)

		CATEGORY OF TRAINING				
	Family of Aircraft	Initial New-Hire	Initial Equipment	Transition	Upgrade	Recurrent
TRANSPORT & COMMUTER CATEGORY	Title 14 of the Code of Federal Regulations (14 CFR) Part 121 Group I (Reciprocating)	66(48)	56(40)	56(40)	(16)	16.5(8)
	Part 121 Group I (Turboprop)	82(56)	72(48)	64(48)	(16)	20.5(8)
	Part 121 Group II (Turbojet)	122(64)	112(64)	80(64)	(24)	25.5(8)
	14 CFR Part 135 Transport and Commuter Category	72(56)	64(48)	64(48)	(16)	16(8)
MULTIENGINE	Part 135 Instrument Flight Rules (IFR)/ Visual Flight Rules (VFR)	32(16)	24(16)	24(16)	(8)	8(4)
	Part 135 VFR Only	24(16)	20(8)	20(8)	(4)	4(4)
SINGLE-ENGINE	Part 135 IFR/VFR	20(8)	16(8)	16(8)	(4)	8(4)
	Part 135 VFR Only	12(8)	8(4)	8(4)	(4)	4(4)
HELICOPTER	IFR/VFR	32(16)	24(16)	24(16)	(8)	8(4)
	VFR Only	24(16)	20(8)	20(8)	(4)	4(4)

D. Regulatory Programmed Hours. Part 121, §§ 121.419 and 121.427 specify 14 CFR programmed hour requirements for initial and recurrent aircraft ground training curriculum segments. The regulatory programmed hours for these categories of training are listed in Table 3-53 below.

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Table 3-53. Part 121 Regulatory Programmed Hours for Ground Training Curriculum Segments

		14 CFR Programmed Hours by Category of Training					
		Initial		Initial for Pilots Who Have Completed the ATP CTP*		Recurrent	
		Before March 12, 2019	Beginning March 12, 2019	Before March 12, 2019	Beginning March 12, 2019	Before March 12, 2019	Beginning March 12, 2019
Part 121 Airplane Groups	Group I (Reciprocating)	64	66	54	56	16	16.5
	Group I (Turboprop)	80	82	70	72	20	20.5
	Group II (Turbojet)	120	122	110	112	25	25.5

*The Airline Transport Pilot (ATP) Certification Training Program (CTP) requirements are outlined in 14 CFR part 61, § 61.156. The required initial programmed hours for pilots who have completed this course may be reduced as indicated.

1) Under § 121.405(d), a POI is authorized to approve reductions to the 14 CFR programmed hour requirements of these three categories of training. When approving reductions to the 14 CFR programmed hours, a POI must determine that the training aids, devices, and methods and procedures used by the operator will increase the quality and effectiveness of the training. The initial or final approval of these part 121 aircraft ground training curriculum segments must contain a statement giving the basis for the reduced 14 CFR programmed hours (see Volume 3, Chapter 19, Section 2, paragraphs 3-1106 and 3-1110). If the approved training hours are also below the threshold training hours in Table 3-52, the POI must notify AFS-200 by memo. The memo must describe the reasons and actions resulting in the approval and include a copy of the approved aircraft ground training curriculum segment outline and any additional supporting information submitted by the air carrier. This AFS-200 notification is necessary for tracking and standardization purposes.

2) Under § 121.418(c), a POI is authorized to approve a modification to the 14 CFR programmed hour requirements for these three categories of training for designated related aircraft. When approving a modification to the 14 CFR programmed hours, the POI must determine that the training hours for the designated related aircraft are realistic based on the training methods and level of differences specified in the FSB report. Unless reduced in accordance with § 121.405(d), the 14 CFR programmed hour requirements for these three categories of training apply to the base aircraft. (See Volume 3, Chapter 19, Section 12 for additional information regarding related aircraft designation and related aircraft differences training.)

3) There are no other categories of training in part 121 that specify 14 CFR programmed hour requirements. Part 135 does not specify any 14 CFR programmed hour requirements.

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3-1201 COURSE COMPLETION REQUIREMENTS. Completion of the curriculum segment must be documented by an instructor's or supervisor's certification that the student has successfully completed the course. This certification is usually based on the results of a written examination given at the end of the course. With some training methods, the certification may be based on student progress checks administered during the course.

3-1202 CONTENT OF AIRCRAFT GROUND CURRICULUM SEGMENTS.

A. Training Subject Areas. An aircraft ground curriculum segment must show that training will be given in three distinct subject areas appropriate to the specific aircraft. These subject areas of training are "general operational subjects" (see paragraphs 3-1203 and 3-1204), "aircraft systems" (see paragraph 3-1205), and "systems integration" (see paragraph 3-1206). An operator should develop separate training modules for each of these distinct areas of training. Usually, training in systems integration should occur during the latter part of the course. However, other methods of training module development and sequencing of training may be fully acceptable.

B. Modification of Subject Areas for Designated Related Aircraft. Under § 121.418(c), a POI is authorized to approve a modification to the ground training subject requirements of § 121.419 for designated related aircraft based on the FSB report. (See Volume 3, Chapter 19, Section 12 for additional information regarding related aircraft designation and related aircraft differences training.)

3-1203 GENERAL OPERATIONAL SUBJECTS FOR PART 135 GROUND TRAINING. The subject area of ground training, referred to as "general subjects," includes instruction on certain operational requirements that are specific to the operation in which the training is being conducted. The general subject area of a ground training curriculum segment may include instruction on many subjects but must include instruction in at least the following:

A. Dispatch, Flight Release, or Flight-Locating Procedures. As applicable to the specific aircraft.

B. Weight and Balance (W&B) Procedures. Specific to the aircraft, including computation of company W&B forms.

C. Adverse Weather Practices. Includes procedures specific to the aircraft that must be followed when operating in the following conditions:

- Icing,
- Turbulence,
- Heavy precipitation,
- Thunderstorms with associated wind shear and microburst phenomena,
- Low visibility, and
- Contaminated runways.

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D. Recognizing and Avoiding Flat-Light, Whiteout, and Brownout Conditions. For helicopter pilots, procedures for aircraft handling in flat-light, whiteout, and brownout conditions, including methods for recognizing and avoiding those conditions.

E. Communication and Navigation Procedures. Procedures for operating specific aircraft communications and navigation equipment in accordance with the following:

- Specific company communications requirements,
- Air traffic control (ATC) clearance requirements,
- Area departure and arrival requirements,
- En route requirements, and
- Approach and landing requirements.

F. Performance Characteristics. Specific performance characteristics of the aircraft during all flight regimes, including:

- The use of charts, tables, tabulated data, and other related manual information;
- Normal, abnormal, and emergency performance problems;
- Meteorological and weight-limiting performance factors (such as temperature, pressure, contaminated runways, precipitation, and climb/runway limits);
- Inoperative equipment performance limiting factors (such as minimum equipment list (MEL)/Configuration Deviation List (CDL) and inoperative antiskid); and
- Special operational conditions (such as unpaved runways, high-altitude airports, and driftdown requirements).

G. Example Outline. Figure 3-178, Aircraft Ground Training General Operational Subjects Curriculum Segment Outline Example, illustrates one of many acceptable methods in which the “general operational subjects” area of an aircraft ground training curriculum segment could be outlined (including a typical training module):

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Figure 3-178. Aircraft Ground Training General Operational Subjects Curriculum Segment Outline Example

B. GENERAL OPERATIONAL SUBJECTS

1. Flight Control
2. Weight and Balance (W&B)
3. Operations Specifications (OpSpec) (Authorizations and Limitations)
4. Adverse Weather
5. Flight Planning
6. Aircraft Operations Manual
7. Company Operations Manual (Applicable Aircraft Section)
8. Performance

Training Modules Within a Curriculum Segment Applicable to a Specific Aircraft in General Operational Subject Area

4. ADVERSE WEATHER
(a) Operations in ice, slush, and snow
(b) Operations in turbulence
(c) Operations in heavy precipitation
(d) Thunderstorm, wind shear, and microburst procedures
(e) Low visibility operations

Elements Within a Training Module

3-1204 GENERAL OPERATIONAL SUBJECTS FOR PART 121 GROUND TRAINING (§ 121.419). Part 121 ground training for pilots and FEs must contain the subject areas as applicable to their assigned duties noted in Table 3-54, Part 121 Ground Training Subject Areas for Pilots and FEs, below. In accordance with § 121.419, the subject areas for pilot initial ground training vary depending on whether the pilot has previously completed the ATP CTP. After July 31, 2016, all applicants for an ATP Certificate with a multiengine class rating will be required to complete the ATP CTP prior to starting initial training at a part 121 air carrier. As specified in § 121.419(b), the right column in Table 3-54 applies to initial ground training for pilots who have completed the ATP CTP. As specified in § 121.419(a), the left column applies to:

- Initial ground training for pilots who have not completed the ATP CTP because they held an ATP certificate with a multiengine class rating prior to July 31, 2016;
- Transition and upgrade ground training for pilots; and
- Initial and transition ground training for FEs.

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Table 3-54. Part 121 Ground Training Subject Areas for Pilots and FEs

Subject Area	Initial ground training for pilots who have not completed the ATP CTP, transition and upgrade ground training for pilots, and initial and transition ground training for FEs.	Initial ground training for pilots who have completed the ATP CTP in § 61.156. This ground training is specific to the certificate holder's operation.
The certificate holder's dispatch or flight release procedures.	X	X
Principles and methods for determining W&B, and runway limitations for takeoff and landing.	X	X Method only (not principles)
Enough meteorology to ensure a practical knowledge of weather phenomena, including the principles of frontal systems, icing, fog, thunderstorms, and high-altitude weather situations.	X	
Meteorology hazards applicable to the certificate holder's areas of operation.		X
Air traffic control (ATC) systems, procedures, and phraseology.	X	
Navigation and the use of navigation aids, including instrument approach procedures (IAP).	X	
Approved departure, arrival, and approach procedures.		X
Normal and emergency communication procedures.	X	X
Visual cues prior to and during descent below decision altitude (DA)/decision height (DH) or minimum descent altitude (MDA).	X	
Approved Crew Resource Management (CRM) initial training.	X	X
Other instructions as necessary to ensure competence.	X	

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3-1205 AIRCRAFT SYSTEMS. The second subject area of an aircraft ground curriculum segment is the "aircraft systems" area. This area is particularly adaptive to the use of training modules because of the modular nature of each system and its related components. Instruction on each aircraft system must be given in sufficient detail to ensure the student clearly understands system components, limitations, relevant controls, actuators, annunciators, and procedures for various system configurations. An example of one of the many acceptable methods in which the aircraft systems subject area of an aircraft ground curriculum segment outline could be presented is illustrated in subparagraph 3-1199C. It is not possible to list every conceivable aircraft system that should be included in the aircraft ground curriculum segment. However, the following descriptions of training modules (with typical elements) illustrate the depth and scope that should be provided for an operator's submission to be acceptable.

A. Aircraft General. Typical elements include an overview of the basic aircraft, such as dimensions, turning radius, panel layouts, flight deck and cabin configurations, and other major systems and components or appliances.

B. Powerplants. Typical elements include a basic engine description, engine thrust ratings, and engine components such as accessory drives, ignition, oil, fuel control, hydraulic, and bleed air features.

C. Electrical. Typical elements should include elements identifying the sources of aircraft power including engine-driven generators, auxiliary power unit (APU) generator, and external power. Other elements include the electrical buses and related components such as circuit breakers, fuses, the aircraft battery, and other standby power systems, if applicable.

D. Hydraulic. Some typical elements are the hydraulic reservoirs, pumps, accumulators, and the means of routing hydraulic fluid through filters, check valves, and interconnects and to associated actuators and hydraulically operated components.

E. Fuel. Elements include the fuel tank system (location and quantities), engine-driven pumps, boost pumps, system valves, crossfeeds, quantity indicators, and provisions (if applicable) for fuel jettisoning.

F. Pneumatic. Typical elements include bleed air sources (such as engines, APU, or external ground air), and the means of routing, venting, and controlling bleed air via associated valves, ducts, chambers, and temperature- and pressure-limiting devices.

G. Air Conditioning and Pressurization. Typical elements include heaters, air conditioning packs, fans, and other environmental control devices. Pressurization system components include elements such as outflow and negative pressure relief valves with associated automatic, standby, and manual pressurization controls and annunciators.

H. Flight Controls. Elements in flight controls include primary (yaw, pitch, and roll devices) and secondary controls (leading/trailing edge devices, flaps, trim, and damping mechanisms). Elements that indicate the means of actuation (direct/indirect or fly-by-wire) should be included as well as applicable redundancy devices.

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I. Landing Gear. Typical elements should include the landing gear extension and retraction mechanism, including the operating sequence of struts, doors, and locking devices, and brake and antiskid systems, if applicable. Other elements are steering (nose or body steering gear), bogie arrangements, air/ground sensor relays, and visual downlock indicators.

J. Ice and Rain Protection. Elements should include rain removal systems and each anti-icing and/or deicing system that prevents or removes the formation of ice from airfoils, flight controls, engines, pitot-static probes, fluid outlets, flight deck windows, and aircraft structures. Other elements should include system components such as pneumatic/electrical valves, sensors, ducts, electrical elements, or pneumatic devices. The content regarding Ice Contaminated Tailplane Stall (ICTS) should:

1) For airplanes originally type certificated after 1994 and certain airplane models listed under "Susceptibility to Ice Contaminated Tailplane Stall (ICTS)" at http://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/icing_protection_systems/training/:

- Emphasize Airplane Flight Manual (AFM) limitations and procedures in icing conditions (particularly maximum allowable flap deflection);
- Not include a tailplane stall recovery procedure; and
- Not include the 1998 National Aeronautics and Space Administration (NASA)/Federal Aviation Administration (FAA) "Tailplane Icing" video.

2) For all other airplanes:

- Include any airplane manufacturer recommendations regarding operations in icing conditions;
- Not include the 1998 NASA/FAA "Tailplane Icing" video; and
- Include NASA Video GRC-508, "Ice Contaminated Stall," dated October 1, 2016.

NOTE: The "Ice Contaminated Stall" video is available as part of the online course ALC-488, Ice Contaminated Stall Training, available at https://www.FAASafety.gov, under "Wings Courses."

K. Equipment and Furnishings. Typical elements are the aircraft exits, galleys, water and waste systems, lavatories, cargo areas, crewmember and passenger seats, bulkheads, seating and/or cargo configurations, and nonemergency equipment and furnishings.

L. Navigation Equipment. Typical elements are flight navigation system components including flight directors (FD), horizontal situation, radio magnetic indicators (RMI), and navigation receivers (automatic direction finder (ADF), very high frequency omni-directional range (VOR), Area Navigation (RNAV), marker beacon, and distance measuring equipment (DME)) used on the aircraft. Other elements include applicable inertial systems (inertial navigation system (INS) and inertial reference system (IRS)), functional displays, fault indications, and comparator systems; aircraft transponders, radio altimeters, weather radar (WX),

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and cathode ray tube (CRT) or computer-generated displays of aircraft position and navigation information.

M. Autoflight System. Typical elements include such items of equipment as the autopilot, autothrottles, and their interface with aircraft FD and navigation systems, including automatic approach tracking, autoland, and automatic fuel or performance management systems.

N. Flight Instruments. Typical elements should include an overview of the panel arrangement and the electrical and pitot-static sources and alternate sources for the flight instruments. Other elements include attitude, heading (directional gyro (DG) and magnetic), airspeed, Vertical Speed (VS), altimeters, standby flight instruments, and other relevant instruments.

O. Communication Equipment. Elements include very high frequency (VHF)/high frequency (HF) radios, audio panels, in-flight interphone and passenger address (PA) systems, the voice recorder, and air/ground passive communications systems (Aircraft Communications Addressing and Reporting System (ACARS)).

P. Warning Systems. Typical elements are aural, visual, and tactile warning systems, including the character and degree of urgency related to each signal. Other elements include warning and caution annunciator systems, including ground proximity warning (GPW) and takeoff warning systems.

Q. Fire Protection. Elements should include all fire and overheat sensors, loops, modules, or other means of providing visual and/or aural indications of fire or overheat detection. Other elements include procedures for the use of fire handles, automatic extinguishing systems, agents, and the power sources necessary to provide protection for fire and overheat conditions in the engines, APU, cargo bay/wheel well, flight deck, cabin, and lavatories.

R. Oxygen. Typical elements are the aircraft oxygen system, including the installed passenger, crew, and portable systems. Other elements include sources of oxygen (gaseous or solid), flow and distribution networks, automatic deployment systems, regulators, pressure levels, gauges, and servicing requirements.

S. Lighting. Typical elements are the flight deck, cabin, and external lighting systems, including power sources, switch positions, and spare light bulb locations.

T. Emergency Equipment. Typical elements are the type, location, and purpose of each item of emergency equipment such as fire and oxygen bottles, first aid kits, liferafts, life preservers, crash axes, and emergency exits and lights. Other elements include each item of egress equipment such as slides, slide rafts, escape straps or handles, hatches, and ladders or movable stairs.

U. APU. Elements should include installation of the APU, APU capacity, and operation, including its electrical and bleed air capabilities and how it interfaces with the aircraft’s electrical and pneumatic systems. Other elements include the APU components such as inlet doors, exhaust ducts, and fuel supply.

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V. Stall Prevention and Recovery. Beginning March 12, 2019, part 121 pilot initial, transition, and upgrade ground training curricula must include stall prevention and recovery in the clean configuration, takeoff and maneuvering configuration, and landing configuration. Refer to the current edition of Advisory Circular (AC) 120-109, Stall Prevention and Recovery Training, for recommended elements for this topic.

W. Upset Prevention and Recovery. Beginning March 12, 2019, part 121 pilot initial, transition, and upgrade ground training curricula must include upset prevention and recovery. Refer to the current edition of AC 120-111, Upset Prevention and Recovery Training, for recommended elements for this topic.

3-1206 AIRCRAFT SYSTEMS INTEGRATION TRAINING.

A. General. The third subject area of a ground training curriculum segment is referred to as "systems integration training." This area provides the student with training on how aircraft systems interrelate with respect to normal, abnormal, and emergency procedures. This training includes procedures as basic as those for powering the aircraft electrical and pneumatic systems with the APU or as complex as those for programming computerized navigation and autoflight systems. System integration training should include flightcrew interaction in the use of checklists, CRM, and other operational procedures. It is normally conducted using GTDs portraying a specific flight deck layout, including the switch and indicator/annunciator logic. The FSTDs described in the flight training section (Volume 3, Chapter 19, Section 6) may be used for systems integration training. Additionally, CBI or other interactive systems may be used for this training. System integration training may be conducted in conjunction with aircraft systems training or as a later phase of the aircraft ground training curriculum segment.

B. Preparation for Flight Training. Effective systems integration training serves as a logical bridge between conventional ground training instructional delivery methods and flight training. This training allows students to become familiar with the flight deck layout, checklists, operator procedures, and other areas that are best learned before they conduct actual flight maneuvers and procedures. A POI should consider this type of training, and the quality and capability of the involved training devices, as factors in the decision for reducing training hours.

C. Example Modules. The following examples are of aircraft systems integration training modules with typical elements:

1) Use of Checklist. Typical elements include safety checks, flight deck preparation (switch position and checklist flows), checklist callouts and responses, and checklist sequence.

2) Flight Planning. Elements should include performance limitations (e.g., meteorological, weight, and MEL/CDL items), required fuel loads, and weather planning (e.g., lower than standard takeoff minimums or alternate requirements).

3) Display Systems. Typical elements include the use of weather radar and other CRT displays (e.g., checklist, vertical navigation (VNAV) or longitudinal navigation displays).

4) Navigation Systems. Elements include preflight and operation of applicable receivers, onboard navigation systems, and flight plan information input and retrieval.

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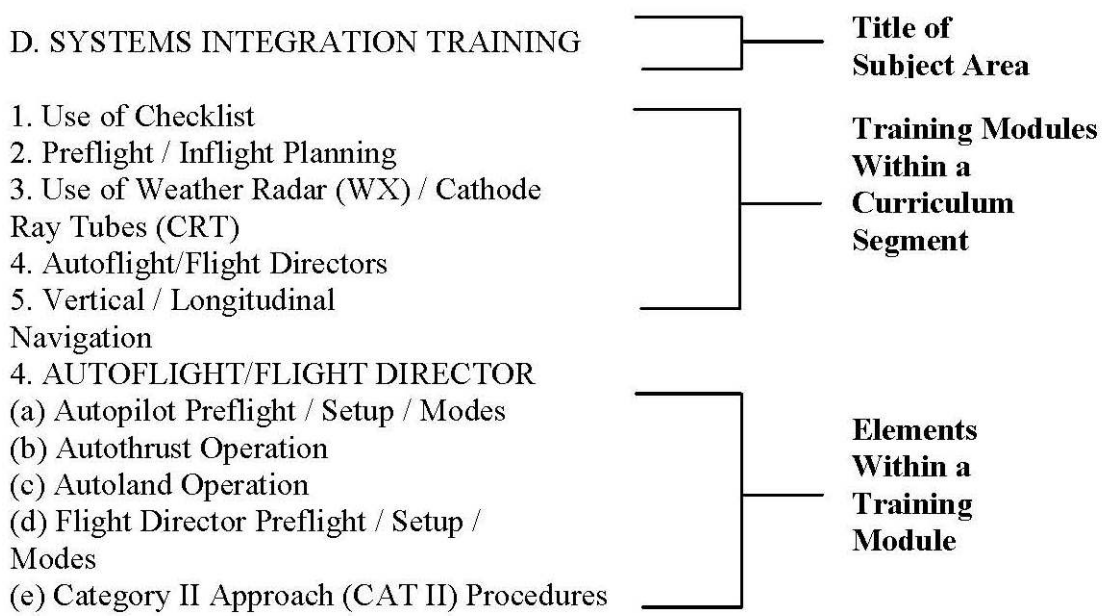
5) Autoflight. Typical elements include the autopilot, autothrust, and FD systems, including the appropriate procedures, normal and abnormal indications, and annunciators.

6) Flight Deck Familiarization. Typical elements include activation of aircraft system controls and switches, to include normal, abnormal, and emergency switches and control positions, and relevant annunciators, lights, or other caution and warning systems.

D. Variations. Aircraft systems integration training may be as simplistic as a student learning checklist procedures in a single-engine aircraft or as complex as programming aircraft computer systems for an international flight. Integration training is particularly effective when an aircraft is equipped with relatively sophisticated computerized navigation, FD, performance, and autoflight systems. The key to effective training in this area is to use a training device that provides an accurate, real-time, and interactive medium for the students during the practice of procedures. The functional requirements of the training device do not necessarily require motion or visual systems or specific aircraft flight data characteristics. However, the training device should accurately portray relevant keyboards, switches, and CRTs and include air/ground and flightpath logic.

E. Example Outline. Figure 3-179, Aircraft Systems Integration Outline Example, illustrates one of the many acceptable methods in which the "aircraft systems integration" subject area of an aircraft ground training curriculum segment could be outlined (including a typical training module):

Figure 3-179. Aircraft Systems Integration Outline Example



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F. Missed Approach/Go-Around Policy and Procedures. Training should also include the certificate holder's policy and procedures regarding missed approach/go-around, including immediate compliance following a missed approach/go-around callout by the pilot flying (PF), pilot monitoring (PM), or the FE, as applicable.

G. APU Announcement.

1) Background.

a) A National Transportation Safety Board (NTSB) study of emergency evacuations cited an evacuation that occurred during the boarding of a Boeing 727. In preparation for flight, the flightcrew started the airplane's APU. An orange flame appeared that extended from the APU exhaust port forward along the right side of the airplane as the APU "torched."

b) The flame was noticeable in the cabin; several passengers screamed "fire" and began to evacuate the airplane via the left overwing exit and the jetway. The flight attendant (F/A) in the rear of the airplane tried to stop the evacuation, but as the rush of passengers approached her, she decided that opening the tailcone exit was a more prudent action. Additionally, passengers also opened the L2 door. When the flightcrew learned of the situation, they issued an announcement over the PA system to remain seated. Control was finally reestablished in the cabin, but not before several passengers received injuries. The NTSB believes that the FAA should ensure that passengers are made aware of the possibility of APU torching just prior to use of the APU to preclude an unwarranted evacuation by passengers who only see "fire" outside the aircraft.

2) Policy. The FAA agrees with the intent of this recommendation. Operators should emphasize emergency situation training modules and emergency evacuation procedures on unwarranted evacuations, including "appropriate" actions on aircraft that are equipped with an APU, which have a tendency to "torch."

a) The best way to address the issue of unwarranted evacuations is to take proactive steps to ensure that they do not occur. APU torching is a known possible outcome of starting the APU. Passenger information regarding the possibility of APU torching would eliminate the panic and confusion that results from passengers simply seeing "fire" outside the aircraft and attempting to evacuate.

b) POIs should inform their assigned certificate holders who operate Boeing 727s to include in their APU procedures instructions stating that during normal operations when passengers are on board, the flightcrew make a PA announcement about the possibility of APU torching immediately prior to starting the APU.

3-1207 GTDs. GTDs are commonly used by operators in the conduct of aircraft ground training. The level of sophistication of these devices may range from a simple paper pictorial display to a static aircraft. They may include slide/tape presentations, CBI systems, aircraft system panels, models, mockups, FSTDs, and numerous other instructional delivery methods. POIs approve or accept each GTD for use when granting initial or final approval of a ground

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training curriculum segment for the operator. GTDs used for systems integration training must be individually evaluated by the POI.

3-1208 EVALUATION OF GROUND TRAINING CURRICULUM SEGMENT OUTLINES FOR INITIAL APPROVAL. When evaluating an aircraft ground training curriculum segment outline, an inspector must determine whether it meets the following criteria:

A. Training Hours. The training hours specified in each curriculum segment outline must be examined. Inspectors should not attempt to measure the quality or sufficiency of training by the amount of training hours alone. Adequacy of quality and sufficiency of training can only be determined by direct observation of training and testing (or checking) in progress or by examination of surveillance and investigation reports. However, the specified training hours must be realistic in terms of the amount of time it will take to accomplish the training outlined in the curriculum segment. Any request and the appropriate justification for reductions to training hours must be submitted with the initial proposal.

B. Appropriate Modules. The curriculum segment outline contains appropriate training modules for the specific aircraft. The training modules should have sufficient elements or events to ensure that the quality and depth of training given in a particular subject area will be provided.

3-1209 CREDITING DISTANCE LEARNING AS A COMPONENT OF GROUND TRAINING FOR FLIGHTCREW—PILOTS AND FEs.

A. Background. In the so-called “information age,” many new information-sharing systems have been developed. These systems have been centered largely on digital technology involving desktop computers and the Internet. These systems include modern training products, many of which are being used effectively today in aviation courses conducted by accredited universities and in air carrier training programs approved by the FAA. Collectively, those products fall under a relatively new heading that has been called “distance learning.” As the quality of those products continues to improve, the training/learning process stands to benefit even more. Previous FAA guidance seemed to presume that traditional classroom training was inherently superior to other ground training. That presumption was reflected in this order and elsewhere. Besides the proven effectiveness of modern training products, distance learning affords a low-cost alternative to classroom ground training, an alternative that is timely and appropriate in today’s challenging economic environment. The updated guidance that follows should promote wider implementation of modern ground training methods apart from the traditional classroom.

B. Applicability. This paragraph applies to flightcrew (pilot and FE) training programs subject to FAA approval under parts 121 and 135. It may also be useful to inspectors who oversee training related to operations under 14 CFR part 91 subpart K (part 91K) (fractional ownership programs), part 125, and part 142 (training centers). Creditability of hours spent in distance learning activities applies to the programmed hours of ground training specified in part 121 regulations and to the national norms shown in this order.

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C. Distance Learning Definition. Distance learning is a term currently not used in FAA regulations. It is a term used in the FAA and in the aviation industry with various meanings depending on context. For the purposes of this order, distance learning means learning that is accomplished by any training method not including an instructor and a gathering of trainees collocated in a traditional classroom. (Distance learning is known by other terms such as E-learning, home study, self-guided training, virtual classroom, distributed training, computer-based training (CBT), web-based training (WBT), and others.)

D. Interim Guidance. Experts continue to develop a systematic approach for using the many effective training methods and products now available. It is unlikely that the last word will be written in the foreseeable future, if ever, since there is apparently no end to the prospects. The guidance contained in this paragraph applies until superseded and should be used to help implement and standardize distance learning among air carriers.

E. Training Objectives and Proficiency. A training objective is a desired performance or behavior demonstrated under certain conditions with respect to specific standards. One way to identify training objectives, and to verify that they have been met (also known as validation), is by a three-tier scheme comprising knowledge, skill, and performance.

1) Knowledge. Specific information required to enable a student to develop the skills and attitudes to effectively recall facts, identify concepts, apply rules or principles, solve problems, and think creatively. Because knowledge is covert, students must be assigned overt activities to demonstrate their knowledge base.

a) Knowledge may be validated through written, electronic, or oral testing.

b) Examples include learning facts by rote, such as an operator's history, organization, and general policies; committing AFM limitations to memory; and getting a basic understanding of an airplane's systems.

2) Skill. An ability enabled by knowledge to perform an activity or action. Skills are often grouped into cognitive skill and psychomotor skill categories.

a) Cognitive Skill. The ability to perform a task requiring the manipulation of words, numbers, and symbols. It requires the application of knowledge and usually involves classification, the application of (mental) rules, procedures or principles, the solution of problems, or the application of creative thinking.

1. Cognitive skill may be validated through written, electronic, or oral testing, or through task performance.

2. Examples include challenging a pilot trainee to apply knowledge of an airplane's limitations to a W&B computation, and applying basic systems knowledge to operating aircraft systems and programming the flight management system (FMS).

b) Psychomotor Skill. The ability to perform a task requiring dexterity, coordination, and muscular activity. It requires the application of knowledge and usually

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involves the manipulation of objects or materials and the use of fine and gross muscular movement in a coordinated manner.

1. Psychomotor skill may be validated through performance of a task.

2. An example is operation of an emergency exit by normal and alternative methods.

3) Performance. Ability to accomplish useful work by combining knowledge, skill, and intangibles such as inference and judgment (sometimes called "soft skills").

a) Performance may be validated through performance of related tasks, sometimes called "event sets."

b) An example is demonstrating competence as pilot in command (PIC) during an instrument landing system (ILS) approach.

F. Scope of Creditability of Distance Learning. Distance learning credit is appropriate for knowledge objectives and for cognitive skill objectives. Creditability of distance learning is more complicated in regard to psychomotor skills and performance and is not addressed in this paragraph.

G. Limits on Creditability of Distance Learning. The FAA recognizes the great training potential of distance learning that is well planned and effectively validated. That potential is already being exploited under the Advanced Qualification Program (AQP). Ground training developed in accordance with an implementation plan (described in subparagraph 3-1209I) is subject to FAA approval. Distance learning may be as much as 100-percent creditable toward the knowledge and cognitive skill training objectives in all ground training, including the following training categories:

- Basic indoctrination,
- Initial new-hire,
- Initial equipment,
- Transition,
- Upgrade,
- Recurrent, and
- Requalification.

H. Ground Training Media. The general nature and specific characteristics of training media used for distance learning vary widely. Examples include paper media, videotapes, CBT, CDs, WBT, and virtual classroom. The media used should meet the requirements of the respective training objective. Validation of training effectiveness is one of the most important components of the implementation plan described below.

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I. Implementation Plan. Any proposal for ground training to be accomplished by distance learning should include a plan for startup, validation, operation, and maintenance of that training. This plan should include at least the following elements:

1) Startup. Identification of knowledge and cognitive training objectives.

a) Ground training objectives can be reduced to simple terms, such as being able:

- To recall,
- To recognize,
- To comprehend, and
- To apply.

b) Identification of the media to be used for ground training and testing.

c) A validation strategy that addresses the effectiveness of the ground training itself, and the learning accomplished by each person trained. Key features of a validation strategy are shown below.

d) Effectiveness of the ground training being conducted.

1. Setting a reference. One validation method is to establish a performance baseline from which to measure the effectiveness of the ground training proposed. Baselines exist in most ongoing air carrier training programs. Examples of performance baselines include average ground training hours a trainee spends in learning a certain subject, average pass–fail rates for tests of ground training content, median scores, average pass–fail rates for flight checks, and many others. A performance baseline may be set by using an existing baseline or by referring to some other existing standard.

2. Maintaining currency. Validation depends upon maintaining the currency of the ground training to be conducted. A reliable method to do so is an essential part of a ground training proposal.

3. Tracking. A method for keeping test results and tracking overall performance.

e) Learning accomplished by each person trained.

1. A strategy for testing. Testing should be designed to determine that training objectives are being met by each trainee.

2. Integrity of tests. A method should be developed to ensure integrity of tests, including integrity of test questions and test answers, and controlled access to tests and test results.

3. Tracking. A method for keeping test results and tracking each individual's performance.

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2) Validation. Validation of ground training is a determination that the training proposed actually succeeds in meeting the performance objectives for that training. Two essential assessments comprise validation of ground training.

a) Systems Knowledge Validation. Assessment of a student's technical knowledge, accomplished by written or oral test.

b) Cognitive Skill Validation. Assessment of an individual's application of knowledge in respect to operation of systems, which may be accomplished by written or oral test, or by a more subjective evaluation by a subject matter expert (SME) such as an authorized ground instructor or an approved check pilot or check FE.

3) Passing Grade—80 Percent. If an electronic testing system (ETS) is used instead of an oral test or oral evaluation, the minimum passing score should be 80 percent. Any incorrect test answers should be addressed at the time of the test and should be corrected to 100 percent. A score less than 80 percent would require retraining in all substandard areas and retesting.

4) Integrity of Test Questions. Integrity of test questions depends on several factors:

a) Scope. A test for an initial or transition trainee should include at least one question for each element contained in each training module. Ground training and testing for trainees in other curriculum segments (e.g., upgrade, recurrent, and requalification) may be less comprehensive, but should cover significant and timely subjects, particularly new material and changes since one's previous recurrent ground training.

NOTE: An element is a subgroup of related content within a training module. It is the fourth level of curriculum detail—curriculum, curriculum segment, training module, element. For example, Hydraulic System is one training module; the yellow system, the green system, and the standby system are elements.

b) Library. A library of questions should be developed that thoroughly cover the training objectives.

c) Multiple Questions. Where possible, multiple questions should be developed for each training objective.

d) Uniqueness. Tests should be generated by random selection of questions from the library, so that no two tests are alike.

e) Currency. Test questions should be reviewed as often as necessary to ensure their relevancy and to incorporate new or changed material.

5) Integrity of Test Answers. Trainers should develop measures by which the identity of a person taking the test may be confirmed, and printed or electronic test answers may not be reproduced and distributed among trainees so as to beat the test.

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6) Operations and Maintenance. Includes quality control (QC) procedures for the collection, protection, and analysis of data for tracking ground training effectiveness; also, a strategy for equipment upgrade, program update, and program adjustments driven by data and feedback from trainers and trainees.

J. Interactivity. Training developers should provide for interactivity between trainees and authorized ground instructors and between the trainees themselves.

1) When in the Field. In particular, a trainee should have ready access to an authorized ground instructor during normal business hours to resolve questions encountered during distance learning and pertinent testing.

2) When at a Centralized Training Location. Before flight training, trainees should be convened in a proctored classroom setting with an authorized ground instructor to resolve any remaining issues arising during distance learning. This interactivity is particularly beneficial in respect to standardization of trainees in initial new-hire and initial equipment curricula.

3-1210 AIRCRAFT GROUND TRAINING CURRICULUM SEGMENT JOB AID. This job aid may be used in addition to completing appropriate Data Collection Tool (DCT) questions from SAS Element 2.1.1.

A. Job Aid Subject Areas. The aircraft ground training curriculum segment job aid (Table 3-55) is provided to assist the inspector in evaluating curriculum segments. The job aid is provided for guidance only and must not be construed as a mandatory or regulatory requirement. The job aid focuses on the three subject areas of this segment: general operational subjects, aircraft systems, and systems integration training. It serves as an aid for evaluating individual training modules.

B. Review of Operator's Proposal. When using the job aid, an inspector should make a side-by-side comparison of the operator's proposal to determine the following:

- Whether each subject is aircraft-specific in terms of description, company policy, and appropriate procedures; and
- Whether sufficient training module elements or events are listed to ensure the appropriate depth and scope of the material being presented.

C. Using the Job Aid. The job aid is organized with the training modules listed in the left column and evaluation criteria or remarks listed horizontally across the top. Inspectors may use the spaces within the matrix for items such as notes, comments, dates, or checkmarks. There are also blank columns and rows in the job aid in which inspectors may include additional training modules for systems unique to a particular aircraft and methods or procedures unique to a particular operation.

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Table 3-55. Aircraft Ground Training Module Job Aid

SUBJECT AREA 1: GENERAL OPERATIONAL SUBJECTS

FOR PART 121 INITIAL FOR PILOTS WHO HAVE NOT COMPLETED THE ATP CTP REQUIRED BY 14 CFR PART 61, § 61.156; FOR PART 121 TRANSITION AND UPGRADE FOR PILOTS; FOR FEs; AND FOR PART 135

	EVALUATION CRITERIA			
TRAINING SUBJECTS	Adequacy of Elements/Events	Adequacy of Courseware	Training Aids and Facilities	
Flight Control*				
Weight and Balance (W&B)				
OpSpec Authorizations/ Limitations				
Adverse Weather				
Flight Planning				
Aircraft Flight Manual (AFM)				
Company Operations Manual				
Performance				

* Flight dispatch (part 121 domestic and flag), flight release (part 121 supplemental), or flight-locating (part 135), as applicable.

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Table 3-55. Aircraft Ground Training Module Job Aid (Continued)

FOR PART 121 INITIAL FOR PILOTS WHO HAVE COMPLETED THE ATP CTP REQUIRED BY § 61.156

	EVALUATION CRITERIA			
TRAINING SUBJECTS	Adequacy of Elements/Events	Adequacy of Courseware	Training Aids and Facilities	
The Certificate Holder's Dispatch or Flight Release Procedures				
Methods for Determining W&B, and Runway Limitations for Takeoff and Landing				
Meteorology Hazards Applicable to the Certificate Holder's Areas of Operation				
Approved Departure, Arrival, and Approach Procedures				
Normal and Emergency Communication Procedures				
Approved Crew Resource Management (CRM) Initial Training				

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Table 3-55. Aircraft Ground Training Module Job Aid (Continued)

SUBJECT AREA 2: AIRCRAFT SYSTEMS

	EVALUATION CRITERIA			
TRAINING SUBJECTS	Adequacy of Elements/Events	Adequacy of Courseware	Training Aids and Facilities	
Aircraft General Equipment and Furnishings				
Emergency Equipment				
Powerplants				
Electrical				
Pneumatic				
Air Conditioning and Pressurization				
Ice and Rain Protection				
Auxiliary Power Unit (APU)				
Hydraulics				
Landing Gear and Brakes				
Flight Controls				
Fuel				
Communications Equipment				
Flight Instruments				
Navigation Equipment				
Autoflight				
Warning Systems				
Fire and Overheat Protection				
Oxygen				
Performance				
Stall Prevention and Recovery (part 121)				
Upset Prevention and Recovery (part 121)				

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Table 3-55. Aircraft Ground Training Module Job Aid (Continued)

SUBJECT AREA 3: AIRCRAFT SYSTEMS INTEGRATION

	EVALUATION CRITERIA			
TRAINING SUBJECTS	Adequacy of Elements/Events	Adequacy of Courseware	Training Aids and Facilities	
Use of Checklist				
Flight Deck Familiarization				
Preflight Planning				
In-Flight Planning				
Use of Weather Radar (WX)/ Cathode Ray Tubes (CRT)				
Navigation Systems				
Communication Systems				
Autoflight/Flight Director (FD)				

RESERVED. Paragraphs 3-1211 through 3-1225.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 20 CHECK AIRMAN, INSTRUCTOR, AND SUPERVISOR PROGRAMS FOR TITLE 14 CFR PART 121 AND 135 CERTIFICATE HOLDERS

Section 6 Safety Assurance System: Part 135 Check Pilot Approval and Surveillance

Source Basis:

- **Section 135.291, Applicability.**
- **Section 135.293, Initial and Recurrent Pilot Testing Requirements.**
- **Section 135.297, Pilot in Command: Instrument Proficiency Check Requirements.**
- **Section 135.299, Pilot in Command: Line Checks: Routes and Airports.**
- **Section 135.321, Applicability and Terms Used.**
- **Section 135.323, Training Program: General.**
- **Section 135.324, Training Program: Special Rules.**
- **Section 135.329, Crewmember Training Requirements.**
- **Section 135.337, Qualifications: Check Airmen (Aircraft) and Check Airmen (Simulator).**
- **Section 135.339, Initial and Transition Training and Checking: Check Airmen (Aircraft), Check Airmen (Simulator).**
- **Section 135.341, Pilot and Flight Attendant Crewmember Training Programs.**
- **Section 135.351, Recurrent Training.**

3-20-6-1 REPORTING SYSTEM(S).

A. Program Tracking and Reporting Subsystem (PTRS) Codes.

- Approve Check Pilot: 1346.
- Remove Check Pilot: 1359.
- Check Pilot Observation—Proficiency Check Oral or Part 135, § 135.293(a) Knowledge Test: 1641.
- Check Pilot Observation—Proficiency or Competency Check (Simulator): 1642.
- Check Pilot Observation—Proficiency or Competency Check § 135.293(b) or § 135.297 (Aircraft): 1643.
- Check Pilot Observation—Line Check § 135.299: 1644.
- Check Pilot Observation—Operating Experience (OE): 1645.

B. Safety Assurance System (SAS) Element(s). This section is related to SAS Element 2.1.2 (OP) Training of Check Airmen and Instructors.

3-20-6-3 OBJECTIVE. This section establishes Federal Aviation Administration (FAA) procedures for the approval and surveillance of check pilots. All check pilots must be approved by an operator's principal operations inspector (POI). The check pilot approval process follows the five phases described in this section.

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3-20-6-5 APPROVAL BASIS. Approval is based on a candidate:

- Satisfying the qualifications and training requirements found in Title 14 of the Code of Federal Regulations (14 CFR) part 135;
- Having the proper certificates and ratings;
- Being qualified in accordance with the operator's approved initial, transition, or upgrade training program;
- Having completed the operator's approved check pilot training program for the appropriate check functions; and
- Having demonstrated the ability to conduct a check and to evaluate the performance of flightcrew members to the satisfaction of an FAA inspector.

3-20-6-7 PHASE ONE—OPERATOR FAMILIARIZATION WITH REQUIREMENTS AND LETTER OF REQUEST.

A. Beginning the Approval Process. The first phase of the check pilot approval process involves a discussion between the operator and the POI. The POI should ensure that the operator understands the regulatory check pilot training requirements and that a candidate must satisfactorily demonstrate the ability to perform check functions to an FAA inspector before approval. The POI should also ensure that the operator is prepared to submit the necessary documentation to initiate the approval process, which is as follows.

B. Required Information. The letter of request constitutes the operator's nomination. It originates from the operator, not a training center, candidate, or some other party. It includes:

- The candidate's name;
- Business address;
- Applicable Airman Certificate number;
- Current flightcrew member position;
- Requested check pilot classification and functions;
- Aircraft type(s);
- Brief résumé of the candidate's aviation background and experience; and
- Copies of the candidate's training records, including his or her initial, transition, or upgrade training in requested aircraft type; most recent applicable recurrent training; and check pilot training.

NOTE: See paragraph 3-20-6-33, Affidavit Use, for additional training record options. Applicable only to contract check pilots associated with 14 CFR part 142 training centers.

NOTE: A POI may require that this information be expanded for unique circumstances.

3-20-6-9 PHASE TWO—SUBMISSION OF DOCUMENTATION. Phase two begins when the operator submits the documentation listed in paragraph 3-20-6-7 to the POI for evaluation. The operator may transmit this submission by conventional mail, email, fax, or by other means mutually acceptable to the operator and the POI. The POI will initially review the information

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to determine if the candidate meets the basic qualification requirements for the classification of check pilot approval sought (see Volume 3, Chapter 20, Section 5).

A. Unacceptable Submission. If the operator's submission is unacceptable, the POI should return the submitted documentation with a letter defining the reason for nonacceptance.

B. Acceptable Submission. If the operator's submission is acceptable, the POI should initiate phase three.

3-20-6-11 PHASE THREE—REVIEW OF DOCUMENTATION.

A. Verification. The POI will verify the candidate's certificates and background using the enhanced Vital Information Database (eVID), the Safety Performance Analysis System (SPAS), PTRS, other sources, and local office procedures. The POI will then create a file for the individual in the check airman section of eVID.

NOTE: Creation of the eVID file at this point in the process will allow for documentation of subsequent action regarding the individual without having the records rejected. During the upload/download process, check pilot surveillance records are cross-checked (last name and certificate number) against the check airman ancillary file in the eVID file for the operator.

B. Training Requirements and Considerations. Before the POI can evaluate a candidate for approval as a check pilot, all required training must be completed. The candidate's training records must show satisfactory completion of initial, transition, or upgrade training and all training required under the operator's approved check pilot training program for the specified classification and functions requested. The approved training program must contain all training required by §§ 135.337 and 135.339 that is applicable to the approval being sought.

C. Check Pilot Expansion of Approved Functions. Check pilot training requirements are identified in § 135.339. When additional check pilot functions are requested, the operator must ensure the respective check pilot training is completed.

D. Nonqualification. If after reviewing the documentation the POI determines that the candidate does not qualify as a check pilot, the POI will provide the operator with a statement identifying the reason for nonqualification.

3-20-6-13 PHASE FOUR—CHECK PILOT EVALUATION GENERAL. In order to evaluate a candidate effectively, inspectors must become thoroughly familiar with the operator's procedures. Inspectors must also become familiar with any special regulatory requirements affecting the operator, such as special conditions contained in the operations specifications (OpSpecs) and exemptions.

A. Choosing Airmen as Subjects. The inspector conducting an evaluation for an original check pilot approval must observe the candidate conducting an actual check. The purpose of the evaluation is to ensure that the candidate has achieved the required skills for briefing, evaluating, and debriefing a flightcrew member. The flightcrew member receiving the

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check should be a line flightcrew member who is due for an evaluation. The flightcrew member will not be an instructor or check pilot, unless previous approval has been received from the POI. Such approval is reserved for unusual circumstances.

B. Candidate's Flying Skills. Except for an initial cadre approval, an evaluation does not entail an evaluation of the candidate's flying skills in a flightcrew member duty position. An operator should not request approval of an individual as a check pilot when there is any question about the individual's flying skills in a flightcrew member duty position. Should the POI have reason to question a candidate's proficiency, the evaluation will not be conducted until the candidate's proficiency is verified. An acceptable way to verify the candidate's proficiency is to check the candidate. An inspector may conduct a proficiency check, a competency check, or a line check of the candidate, scheduled at some time before the official evaluation. (Such checks are not routinely required.)

C. Satisfactory Evaluation. If the inspector determines that a candidate meets criteria for the requested approval, the inspector will inform the candidate that a recommendation of approval will be reported to the POI. In this case, the candidate will certify the proficiency of the flightcrew member receiving the check and complete the necessary recordkeeping tasks. The POI may permit the new check pilot to be scheduled immediately as a check pilot, even though processing of the letter of approval has not been completed, provided that a PTRS entry has been completed to document the satisfactory evaluation.

D. Unsatisfactory Evaluation.

1) If the inspector determines a candidate does not qualify for the requested approval, the inspector will inform the candidate that approval will not be granted. In such a case, the inspector must determine whether the flightcrew member receiving the check performed satisfactorily, and must certify the flightcrew member's proficiency and complete the necessary records.

2) The failure of a candidate is uncommon and usually ends a candidate's eligibility for check pilot status. In rare circumstances, the POI may allow a reevaluation. In such a case, the operator must conduct sufficient additional training, recertify the candidate's proficiency, and arrange to have another evaluation conducted by an FAA inspector.

3-20-6-15 PHASE FIVE—CHECK PILOT APPROVAL. All check pilots approved for part 135 operations must be approved by the operator's POI.

A. Check Pilot Letter of Approval. All check pilots approved to conduct part 135 checks must be approved by the operator's POI. Approval of a check pilot will be in the form of a letter of approval found in Figure 3-20-6B, Sample Check Pilot Letter of Approval, addressed to a responsible official of the operator, and signed by the POI or a representative approved by the POI. This letter of approval may be transmitted to the operator by conventional mail, email, fax, or by other means acceptable to the operator and the POI. The responsible Flight Standards office must retain a copy of the check pilot letter of approval together with the operator's original letter of nomination for the candidate.

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B. Check Pilot Approval Renewal Requirements. Regulations do not require renewal or a term of expiration for the approvals of check pilots. However, check pilots must continue to demonstrate competency and ability in those functions authorized. Since check pilot oversight requirements have defined intervals, the need to reissue approvals is unwarranted, inefficient, and thus not required. Inspectors make performance assessments of the check pilot on an ongoing basis and address deficiencies as needed. Check pilots are selected, appointed, and trained to serve the needs of the operator to meet regulatory requirements. Therefore, a check pilot's approval may be given, limited, or withdrawn at the discretion of the POI for any reason considered appropriate by the Administrator. Check pilots who are performing poorly as a check pilot or as a pilot in line operations, or require excessive resources to manage may have their approval withdrawn to ensure continued effectiveness of the check pilot program. The check pilot letter of approval must contain the following (see Figure 3-20-6B):

- Name and certificate number of the operator for which the approval is granted;
- Check pilot's name and applicable FAA Airman Certificate number;
- Approved check pilot classification;
- Specified category, class, or type of aircraft;
- Authorizations and limitations; and
- Effective date of each approval. (Since different approvals may occur at different times, this information simplifies record checks. The date on which the check pilot was recommended for approval by an inspector will be the effective date of approval.)

C. Letter of Approval—Other Copies.

1) The original letter of approval will be sent to the operator for which the check pilot has been approved.

2) A copy of the letter of approval will be retained in the POI's files, together with the operator's original letter of request for the check pilot. Additional documentation submitted with the letter of request must also be retained if it is not accessible in an FAA database. The file must be maintained in the FAA office files in accordance with the current edition of FAA Order 1350.14, Records Management.

3) When the individual is a training center instructor or Training Center Evaluator (TCE) who is being approved to evaluate an operator's personnel, and if the POI anticipates requesting assistance from the Training Center Program Manager (TCPM) with check pilot surveillance and oversight, a copy of the letter of approval may be forwarded to that TCPM for inclusion in his or her records.

D. PTRS and eVID. PTRS and eVID entries are required whenever there is a change in the approval status of the check pilot. The POI must ensure that a record of the initial approval or when additional functions are added, a PTRS is completed. Each time an approval is given or withdrawn, the POI must ensure that the check pilot eVID file reflects the classification of check pilot and approved functions.

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1) Recording Check Pilot Functions in the eVID. Check the following boxes in the eVID Configuration Check Airman Information Panel (see Table 3-20-6A, Configuration Check Airman Information Panel). In addition, add comments in eVID when optional functions are approved.

Table 3-20-6A. Configuration Check Airman Information Panel

eVID Selection Options	Check corresponding eVID box when authorized
Pilot-All Checks	§ 135.293, § 135.297, § 135.299 checks
Pilot-Proficiency Aircraft	§ 135.293, § 135.297–Aircraft
Pilot-Proficiency Simulator	§ 135.293, § 135.297–Simulator
Pilot Line All Seats	§ 135.299–when authorized in all seats
Pilot Line Observers (Jump) Seat Only	§ 135.299–when limited to observer seat only

2) Issuing Functions. Comment entries:

a) When issuing functions that allow § 135.293(a)(1) and (4)–(8) written or oral tests for other multiple airplanes (applicable for all check pilots types), enter a comment in eVID as follows: "§ 135.293(a)(1) and (4) through (8) multiple airplanes, *(list airplane type(s))*."

b) When issuing functions that allow § 135.293(a)(1) and (4)–(9) written or oral tests for other multiple rotorcraft (applicable for all check pilots types), enter a comment in eVID as follows: "§ 135.293(a)(1) and (4) through (9) multiple rotorcraft, *(list rotorcraft type(s))*."

c) When issuing functions that allow § 135.293(a)(1) and (4)–(9) written or oral tests for other multiple airplanes and rotorcraft (applicable for all check pilots types), enter a comment in eVID as follows: "§ 135.293(a)(1) and (4) through (9) multiple aircraft, *(list aircraft type(s))*."

d) When issuing functions that allow § 135.293(a) written or oral tests (applicable only to line check pilots), enter a comment in eVID as follows: "§ 135.293(a) written or oral tests, *(list aircraft type(s))*."

3) Initial Approval and/or Additional Functions. When the POI determines the initial approval of the check pilot or adds additional functions, it must be recorded in the PTRS using code 1346.

NOTE: Due to PTRS archiving, the PTRS record of initial approval or addition of functions may not be available.

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3-20-6-17 PREVIOUSLY ISSUED LETTERS OF APPROVAL. Previously issued letters of approval will remain in effect until replaced. Approval letters for contract check pilots do not need to be updated at this time.

3-20-6-19 APPROVAL OF INITIAL CADRE CHECK PILOTS. During the early phases of establishing a check pilot program, initial cadre check pilots are required. Initial cadre check pilot candidates must first become fully qualified as flightcrew members and then be trained, evaluated, and approved as check pilots. Because the regulatory language of part 135 does not address a training process for initial cadre check pilots, this section provides guidance. This process that follows is valuable for startup operations for at least two reasons:

- It is a practical way to initiate and build a check pilot program; and
- It takes advantage of proving flights, when the operator/applicant is under close FAA scrutiny, with desirable effects on the check pilot program.

A. Letter of Request from Operator. The overseeing inspector must arrange with the operator/applicant to approve one or more likely candidates to form an initial cadre of temporary check pilots. The operator/applicant will submit a letter of request, as described earlier in this section. This letter comprises the request for initial cadre check pilots and a description of the training that they will undergo.

B. Letter of Approval. The POI must approve the candidates using procedures described earlier in this section. The initial cadre letter of approval is a temporary approval, to be replaced with a permanent letter of approval after the check pilot is fully qualified. The initial cadre letter must contain a statement similar to the following:

> (Name) is approved as an initial cadre check pilot with the following functions for the purpose of initiating operations with the (type of aircraft) for (name or operator). This approval expires on (expiration date).

C. Training, Certification, and Qualification—Startup. The operator must provide a full qualification process for its initial cadre check pilots.

D. Initial Training and Certification. The operator must first arrange to have initial cadre check pilots trained and appropriately certificated for their flightcrew member duty positions. The operator may provide the training by contracting with a manufacturer, with another operator of the same 14 CFR operating part, or with properly qualified individuals. An inspector or an aircrew program designee (APD) designated examiner may certificate the initial cadre, provided that the examiner is employed by a U.S. air carrier/operator.

E. Gaining Proficiency as Instructors. After the initial training and certification, initial cadre check pilots must become proficient in the operator's proposed training program by instructing each other, or in the case of a single initial cadre check pilot, by self-training. During this training, an operator may arrange for a pilot from the manufacturer, from another operator, or from another source to act as the safety pilot or instructor pilot.

F. Proficiency and Competency Checks. After the first initial cadre check pilots have become proficient as instructors, they may then begin the training and checking of other

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initial cadre check pilots in accordance with the operator's initially approved flight training and qualification curriculum segments. Each check must be observed by an FAA inspector who holds the appropriate Airman Certificate, and the appropriate type rating, when applicable. If the inspector determines that the performance of an initial cadre check pilot conducting a certain check is satisfactory, the inspector will recommend to the overseeing inspector that the candidate be approved as an initial cadre check pilot for that type of check. One initial cadre check pilot may check another, with the process repeated until each candidate has been approved as an initial cadre check pilot or has been terminated from the program. If only one person is being considered to be the initial cadre check pilot an inspector will observe that person conducting a check of another flightcrew member. If the candidate's performance is satisfactory, the inspector must recommend to the POI that the candidate be removed from temporary status and approved for full-time check pilot duty with the operator.

G. OE.

1) Initial cadre check pilots will be permitted to acquire OE flight hours on any flight that can be credited toward the proving test flight-hour requirement (including training flights, ferry flights, and representative en route proving flights). OE flight hours may be accrued by initial cadre check pilots while they are:

- Conducting aircraft checks,
- Overseeing the OE of other flightcrew members,
- Being checked, or
- Acquiring OE under the supervision of other initial cadre check pilots.

2) Initial cadre check pilots must receive a line check and conduct a line check during an en route proving flight or a ferry flight. The same process (see above) will apply: one initial cadre check pilot line checks another while being observed by an FAA inspector. If the check pilot's performance is satisfactory, the inspector may recommend that the person be removed from temporary status and approved for full-time duty as a check pilot for the operator. If there is only one initial cadre check pilot, then the FAA inspector will conduct the line check.

3-20-6-21 APPROVAL OF A CHECK PILOT IN MULTIPLE AIRCRAFT. Before a candidate may be approved as a check pilot in more than one type of aircraft, the operator must show that there is a need. The candidate must be fully qualified and current in each of the aircraft types. Overseeing inspectors must be judicious in approving check pilots and vigilant in overseeing their performance. There are various acceptable combinations of check pilot approvals.

A. All Single-Engine, Normal, or Commuter Category Airplanes. A check pilot may be approved to serve in all single-engine, normal, or commuter category airplanes that an operator operates under part 135.

B. Helicopters. A check pilot may be approved to serve in two different types of helicopters.

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C. More Than One Aircraft Family. A check pilot may be approved to serve in a combination of two of the following aircraft families:

- One series of multiengine, normal, or commuter category airplanes;
- Single-engine, normal, or commuter category airplanes; or
- Helicopters.

D. More Than One Commuter or Transport Category Aircraft Type. Before a candidate may be approved as a check pilot—aircraft, in two commuter category aircraft types or two transport category types, the overseeing inspectors must ensure that the following conditions are met:

1) Check pilots with § 135.293 or § 135.297 authority. The candidate must have logged at least 500 hours as pilot in command (PIC) in each type.

2) Check pilot with only § 135.299 authority—all seats. The candidate must have logged at least 100 hours as PIC in each type and at least 1,000 hours as PIC in transport or commuter category airplanes.

3-20-6-23 APPROVAL OF A CHECK PILOT OR FOR MULTIPLE OPERATORS. This paragraph provides a standardized method for approving a check pilot to serve multiple operators. When the following considerations are satisfied a letter of approval may be issued by the certificate holders POI. Only one certificate holder may be listed on a check pilot's letter of approval.

A. Limitations. The approval of a check pilot to serve more than one operator is limited to those cases in which the operator's aircraft, aircraft operating manuals, procedures, and checklists are compatible in the judgment of the overseeing inspector(s).

B. Multiple Check Pilot Approvals. Provision for multiple check pilot approvals may be made for part 135 single-pilot operators, part 135 single PIC operators, and part 135 operators with programs that are compatible, in the judgment of the respective operator's POI.

C. Temporary Check Pilot Approval. An operator's POI may also approve a check pilot on a temporary basis, when a startup operation is initiated or when new equipment is being introduced.

D. Other Situations. Other multiple approvals may be made with the concurrence of the applicable General Aviation Division manager when justified.

E. Unique Situations. For unique situations, the Air Transportation Division (AFS-200) may be consulted for additional information.

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3-20-6-25 TRAINING CENTER INSTRUCTORS/EVALUATORS APPROVED BY AN OPERATOR'S POI AS CONTRACT CHECK PILOTS. Training centers have made flight simulation training device (FSTD) training and checking available to a broad range of aviation users, including operators with smaller fleets and smaller aircraft. With the approval of an operator's POI, an employee of a part 142 training center may serve one or more operators as a contract check pilot. The guidance contained in this paragraph applies to training center personnel who have been requested to serve as such contract check pilots.

A. POI Approves the Check Pilot Candidate. Only the POI may approve a check pilot for use in an operator's training program. Normal procedures apply, including a letter of request from the operator, and a letter of approval from the operator's POI.

B. TCPM Role. Without diminishing the responsibility or authority of the POI, experience has shown that the TCPM may be in the best position to make quality assessments at training centers on behalf of the Administrator. The TCPM continually assesses training programs conducted by a training center for certification of airmen under 14 CFR part 61. Similarly, the TCPM assesses the instructors and TCEs employed by a training center. At the request of an operator's POI, a training center's TCPM may therefore assist with the evaluation of an operator's request to use the services of a center's employee as a contract check pilot.

C. Scheduling Multiple Use Check Pilots and Maintaining Check Pilot Status. Before a multiple-use approval is made, the overseeing inspector must ensure that the operators understand that the scheduling and use of the check pilot is their responsibility. An operator entering into a multiple-use arrangement may employ a check pilot on a part-time basis, may contract with another operator or training center to provide a check pilot, or may contract directly with the check pilot.

NOTE: Each operator is responsible for ensuring that the check pilot maintains currency as specified in the appropriate operating rule, and in Volume 3, Chapter 20, Section 5, and that he or she performs adequately when serving the operator.

D. Issuing Additional Letters of Approval. An operator seeking check pilot approval for an individual who is serving as a check pilot for another operator must provide the necessary information to its POI. The operator's POI must consider the means the operator will use to train, to qualify, and to maintain qualification of the contract check pilot candidate and the documentation that will be required. Contract check pilots may be able to meet recurrent training requirements for more than one operator simultaneously. When the operator and the POI have agreed on the training and qualification necessary for the contract check pilot the operator must submit a written letter of request to the POI, as described earlier in this section. When the second or subsequent POI approves the individual as a contract check pilot for his or her operator, that POI will issue an additional letter of approval following the procedures described above. Additionally, if the subject check pilot is an employee of a part 142 training center, the POI will forward a copy of the new approval letter to the center's TCPM.

E. Primary Oversight Responsibility. Each operator for which an individual is approved as check pilot along with the operator's POI, has responsibility for oversight of the

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contract check pilot. When the check pilot is employed by a training center, the FAA TCPM may provide assistance as requested by the POI with this responsibility. Any POI who has issued a letter of approval to the check pilot may, however, conduct surveillance activities at any time.

F. Contract Check Pilot or Letter of Approval. When approved as a contract check pilot for an operator, the POI of that operator will issue a letter of approval showing the operator, the check pilot classification, the type(s) of aircraft authorized, and the type(s) of checks authorized (by regulatory reference). A sample contract check pilot letter of approval is provided on the FAA Air Carrier Training Systems and Voluntary Safety Programs Branch's (AFS-280) website at:
http://www.faa.gov/pilots/training/part_142/media/check_pilot_loa.doc.

G. Recordkeeping. Each operator is required by their operating rules to maintain training and qualification records for their check pilots. This responsibility cannot be delegated. However, by agreement between the operator and the training center, a training center may keep a contract check pilot's training and qualification records. This agreement must be documented in each operator's recordkeeping system and approved by the POI. The POI must maintain a record in the operator's file that documents the details of any such arrangement, including the location in the operator's manual where such arrangement is described.

3-20-6-27 FLIGHTCREW MEMBER FAILURE RATES. The repetitive failure of a single flightcrew member or the failure of several flightcrew members during proficiency or competency checks, may indicate a training program deficiency. Overseeing inspectors must establish procedures with their certificate holders that provide for FAA notification when flightcrew member unsatisfactory performance occurs. Identified deficiencies should be promptly investigated and corrective action taken.

3-20-6-29 OVERSIGHT OF CHECK PILOTS. Responsible inspectors must establish a surveillance program for each check pilot at the time of approval.

A. Biennial Check Pilot Observation.

1) Observation of Approved Checking Activity. The surveillance program for each office must include an observation by an FAA inspector or APD of each approved check pilot in his or her area of responsibility at least once every 24 months. Check pilot observations should be conducted while the check pilot is conducting an approved checking activity. For example, a check pilot approved to conduct proficiency checks and line checks should be observed conducting a proficiency check in the aircraft or FSTD or conducting a line check. At the discretion of the POI, an observation conducted by another inspector or by a TCPM for a check under the same rule part need not be repeated. It is the responsibility of the operator to maintain records showing that this observation has been completed. See paragraph 3-20-6-31, Check Pilot Oversight and Surveillance, for additional details regarding the 24-month observation required by § 135.339.

NOTE: Section 135.339(a)(2) requires a check pilot to be observed conducting a "proficiency or competency check." In the preamble to the Training and Qualification Requirements for Check Airmen and Flight Instructors final rule

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(61 FR 30734), which established this requirement, the FAA explained that, "This final rule addresses check airmen as a broad category. Other specific categories of check airmen (i.e., line check airmen, proficiency check airmen, etc.) also were not mentioned. It was not the intent of this rule to address specific categories of check airmen beyond check airmen (airplane) and check airmen (simulator)." Therefore, in § 135.339(a)(2), the phrase "proficiency or competency check" is used broadly to include checks required under part 135 that assess a pilot's flight proficiency or competency. Observation of any of the following checks can meet the requirement of § 135.339(a)(2): PIC or SIC § 135.293(b) competency check, § 135.297 PIC instrument proficiency check, or § 135.299 PIC line check. An FAA inspector or APD should observe the check pilot conducting a check appropriate to the checking functions approved for that check pilot. For example, a check pilot who is only authorized to conduct § 135.299 PIC line checks should be observed conducting a PIC line check.

2) Constraints of Aircraft With Two Pilot Seats. Inspectors may encounter difficulties in conducting the surveillance of check pilots whose activities are restricted to two-place airplanes or helicopters. In such cases, it may not be possible for an inspector to observe the check pilot conducting actual checks. In lieu of these observations, the POI may review the check pilot's activities and arrange for an inspector to administer the check pilot's competency and line checks.

B. Periodic Report by the Operator. The POI should arrange to have the operator provide the POI with a periodic report of each check pilot's activities, including a pass/fail rate, to coincide with the POI's periodic review (annual, semiannual, or other). A POI may arrange for these reports to arrive at a time that meets the POI's needs. A check pilot should be active enough to retain the required knowledge and skills. This activity level may vary depending on the check pilot function, the size of the operator, and the number of approved check pilots. The POI should specifically reassess the operator's need for those check pilots whose records indicate low activity levels or when deficiencies are observed when performing authorized functions.

C. Withdrawing Check Pilot Approval. The POI's reasons for withdrawing the approval of a check pilot may include a lack of check pilot activity, a request by the operator, or an unsatisfactory performance on the part of the check pilot. To withdraw approval of a check pilot, the POI must notify the operator by letter that approval is withdrawn. The letter should include the name of the check pilot, the effective date of withdrawal, and the reason approval is being withdrawn. If the approval of a check pilot is withdrawn because of unsatisfactory performance, the letter of withdrawal must be sent to the operator by certified mail—return receipt requested. The POI must make a PTRS entry identifying the reason for the withdrawal or termination of a check pilot's letter of approval.

NOTE: Under current regulations, no normal term of expiration is specified for approvals of check pilots. Contract check pilots who are employees of a part 142 training center will have their term contingent upon continued employment with the training center and maintaining their instructor or evaluator qualification with the employing center.

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D. POI Authority. A check pilot's approval may be given, limited, withdrawn, or terminated at the discretion of the POI.

3-20-6-31 CHECK PILOT OVERSIGHT AND SURVEILLANCE. This paragraph will explain the surveillance methods available to inspectors as well as general oversight considerations.

A. Elements of a Check Pilot Evaluation. Maintaining an accurate surveillance records in the Enhanced Flight Standards Automation System (eFSAS) is crucial to long term management of individual check pilots.

B. Surveillance Event Types. Inspector surveillance events are described below.

1) Check Pilot Observation. Refer to § 135.339(a)(2). This observation conducted by the FAA or APD is to determine if the check pilot has the ability to perform the function(s) authorized in accordance with the operator's training program and regulatory requirements. Use PTRS activity codes 1641–1645.

2) Records Review. Records review is an administrative function that allows the POI to review the quality of the records submitted by the check pilot, whether paper or electronic.

3) Check Pilot Interaction. This is a record of any interaction that has occurred with the check pilot that the POI deems relevant enough to include in the check pilot's file.

C. Check Pilot Observations. Section 135.339(a)(2) requires that check pilots are observed by an inspector or an Aircrew Designated Examiner (ADE) within the preceding 24 calendar-months. Check pilots are required to be observed conducting an applicable § 135.293(b) competency check or § 135.297 PIC instrument proficiency check in an aircraft or FSTD, or § 135.299 PIC line check in an aircraft, in addition to optional functions that are issued. The observation check required by § 135.339(a)(2) is considered to have been completed in the month required if completed in the calendar-month before, or the calendar-month after, the month in which it is due. If the observation check is not conducted, the individual may no longer serve as a check pilot.

D. Check Pilot With Optional Function Approval(s). The following oversight applies to the content of the inspector's evaluation of the check pilot when additional functions have been approved. The content of the evaluation is dependent upon the approval(s) requested.

1) Written or Oral Test Approval (Available to § 135.299 Check Pilots Only). As part of the § 135.339 observation check, an inspector must evaluate the candidate while the candidate conducts a complete written/oral test required by § 135.293(a).

2) Written or Oral Test Multiple Aircraft Approval (Available to All Check Pilots Except Contract Check Pilots). As part of the § 135.339 observation check, an inspector must evaluate the check pilot conducting an oral/written test required by § 135.293(a)(1) and (4) through (9) as authorized in their approval letter. (Section 135.293(a)(9) only applies to rotorcraft.)

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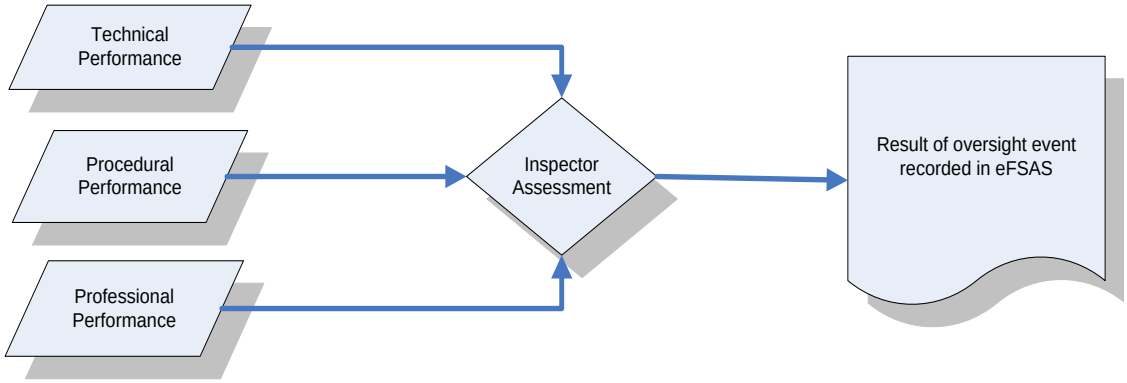
E. Check Pilot Performance Measures. The performance measures below have been established to aid in the consistent evaluation of all check pilots. The three categories of performance measures are technical, procedural, and professional (see Figure 3-20-6A, Performance Measure Consolidation). The type of oversight activities conducted will determine the performance measure attributes considered by the inspector.

Figure 3-20-6A. Performance Measure Consolidation



1) Technical. The check pilot must demonstrate a superior level of technical knowledge, skill, and ability in order to conduct authorized tasks.

a) Equipment and Materials. Does the check pilot select or use the appropriate equipment, device, tools, and reference material when planning or conducting checks?

b) Knowledge and Understanding.

1. Does the check pilot understand the technical terminology contained in the operator manual, the training program, and other reference material used in planning, describing, or conducting pilot checks?

2. Is the check pilot thoroughly familiar with the operator's standard operating procedures, authorizations/limitations, checklists, and other items used by the operator?

3. Does the check pilot demonstrate an expert level of knowledge about the aircraft operation and systems?

c) Interpret and Apply.

1. Does the check pilot correctly interpret and apply the technical performance standards defined by the appropriate training program standard?

2. Does the check pilot demonstrate effective questioning techniques?

2) Procedural. The check pilot must demonstrate compliance with the operator policies and procedures contained within the operator's manuals and applicable regulations used to conduct approved functions. Factors in determining procedural proficiency:

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a) Does the check pilot properly submit information, documents, or data to the operator when required by operator procedures and FAA regulations?

b) While conducting the check:

- Does the check pilot follow the correct procedures when conducting, grading, and providing feedback to pilots during checks or observations?
- Does the check pilot have a plan of action to conduct the check?
- Do pre-briefings contain clear objectives, safety briefing elements, and completion standards?

c) Does the check pilot:

- Complete required events?
- Demonstrate effective workload management?
- Identify deviations from applicable standards and procedures?
- Demonstrate knowledge and observation of the operator's procedures?
- Conduct the check and ensure safe operation of aircraft or proper operation of the FSTD?
- Use proper air traffic control (ATC) phraseology?
- Conduct a debriefing that is accurate, appropriate, clear/concise and informative?
- Demonstrate the proper use of training aids and FSTDs that are realistic and contain appropriate scenario progression?
- Utilize training aid and FSTD capabilities?
- Demonstrate the ability to efficiently use FSTDs?

d) Does the check pilot follow the correct procedure(s) when completing approvals, recording results, or other administrative items upon completion of the checking activity?

3) Professional. Professionalism means compliance with ethical and technical standards that indicate a professional representation of a person approved by the Administrator. This includes the quality, completeness, and timeliness of oral and written communications and the continual demonstration of integrity, tact, and diplomacy with pilots, industry, and the FAA. Factors in determining professionalism are:

a) Oral/Written Communication. There are no reported issues of deficient communications between the check pilot, operator, and FAA.

b) Professional Representation of the Operator and the FAA. The POI should consider whether the check pilot demonstrates a positive reflection of the approval provided by the FAA and a willingness to comply with FAA requirements and operator policies and procedures.

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c) Cooperative Attitude. The POI should consider whether the check pilot works effectively with and presents a positive attitude when interacting with pilots, operators, and the FAA.

d) Ethics and Judgment. The POI should consider whether the check pilot maintains the highest standards and demonstrates good judgment in the conduct of authorized activities.

F. Overall Oversight Assessment. In determining the overall oversight assessment, the inspector considers the frequency, causal considerations, and safety significance of the three performance measure criteria.

1) Frequency of Deficiencies. The frequency of deficiencies is based on the inspectors evaluation with the following considerations applied:

a) No performance related issues noted.

b) Few or minor performance related issues noted.

c) Some issues noted, but were corrected and/or were of minimal impact to safety.

d) Some significant issues were noted and were safety related.

2) Causal Considerations.

a) Unknowingly—the check pilot was not aware of the error.

b) Carelessly—as a result of inattention by the check pilot, an error was made.

c) Intentionally—the check pilot demonstrates a disregard for policy, procedures, or regulatory requirements.

3) Safety Significance.

a) Because the role of the check pilot is to ensure that the pilot has met competency and safety standards required by regulations and the operator, the position requires an exceptional level of integrity, dedication, knowledge, and professionalism. With high initial standards required, any deficiencies should be carefully noted, reviewed, and appropriate action taken.

b) There is minimal tolerance for the display of safety deficiencies, less tolerance for careless acts, and no tolerance for the intentional disregard of safety standards by check pilots. The inspector must carefully consider the cumulative safety significance of deficiencies and causal factors when determining the overall assessment of the check pilot. If the inspector determines that the level of performance expected of the check airman is unsatisfactory, actions must be taken to rescind the check pilot’s approval.

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4) Recording the Observation. Upon completion of the check pilot observation, the inspector must record the result of the inspection in PTRS by using the appropriate activity codes 1641–1645. If the POI determines that the results of the event require additional review, the POI should determine and record in eFSAS any appropriate followup activity.

3-20-6-33 AFFIDAVIT USE. This paragraph is applicable only to contract check pilots and instructors associated with part 142 training centers.

A. Lost or Unattainable Records. A POI may accept an affidavit for initial training records if a contract instructor or contract check pilot is unable to produce all required records because:

- The records are lost;
- The air carrier is defunct; or
- The air carrier remains in existence, but no longer has the records.

B. Supporting Documentation. The pilot and the air carrier/operator or program manager for which the contract instructor or contract check pilot nomination has been requested may submit a signed and notarized statement (affidavit) attesting to the completion of training identified in Volume 3, Chapter 54, Section 5, subparagraph 3-4415F3) as the basis for having completed the training. The statement must be substantiated by all available evidence, such as completed check ride forms, available training records, logbook entries and other records attesting to flight operation participation, associated pay stubs, W-2 forms (with financially confidential information redacted), tax returns, a statement from a current or former employee of the air carrier/operator or program manager, and other proofs of employment. The pilot and the air carrier/operator or program manager representative must read, sign, and submit a notarized statement containing the information found in Figure 3-20-6D, Contract Instructor and Contract Check Pilot Nominee Training Records Affidavit, and Figure 3-20-6E, Nominating Air Carrier/Operator Affidavit for Lost/Unobtainable Pilot Training Records, and provide supporting documentation to the POI. If the affidavit and documentation that reasonably support the affidavit are provided, the POI may accept the information as meeting the initial new-hire training requirement. An affidavit without supporting documentation must not be accepted.

C. False Statements. A pilot who has lost or is unable to obtain training records should be reminded that any fraudulent or intentionally false statements concerning these records are a basis for enforcement action in accordance with Title 18 of the United States Code (18 U.S.C.) § 1001 and part 61 that could result in a fine, imprisonment, and action against any certificate or rating held.

D. Supporting Documentation Review. The POI should consider the following when determining the acceptability of the documentation provided:

1) Review Records. Review and determine the validity of the records.

2) Ensure Clarity. Ensure that records clearly identify the air carrier/operator and associated employment.

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3) Review FAA Database(s). Review FAA database(s) to determine if the air carrier/operator or program manager has records to verify its existence.

4) Review PTRS Records. Review PTRS records that may support the nominee's activities with the air carrier/operator or program manager. (This is not required, but could be used for confirmation in some cases.)

5) Review Evidence. Review the evidence the nominee has provided that confirms the air carrier/operator or program manager no longer retains the records or has not responded to a record request for an air carrier/operator or program manager that currently remains in existence.

6) Review Participation and Qualification. Review records or supporting documents (e.g., logbooks, dispatch releases, evidence of employment, or a statement from a current or former employee of the air carrier/operator or program manager) that attest to or confirm the nominee's flight program participation and qualification as a pilot for the air carrier/operator or program manager.

7) Recordkeeping Requirements. For a contract check pilots only, the POI must maintain a copy of the affidavits in the FAA's check airman file.

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Figure 3-20-6B. Sample Check Pilot Letter of Approval

April 19, 2013

Mr. Sam A. Frost
Chief Pilot
Transcon Express, Inc.
48 Perimeter Rd.
Utica, OH 22032

Dear Mr. Frost:

John R. Smith, FAA certificate number 467120928, is approved as a check pilot. This check pilot is approved to conduct checks for Transcon Express, certificate number A1BC, and their pilots. This approval is applicable for the following checking functions:

	Classification and Types		***Effective Date***
	Simulator M/M/S(s)	***Aircraft* Type(s)**	
Section 135.293 competency check	N/A	N/A	N/A
Section 135.297 proficiency check	N/A	N/A	N/A
Section 135.299 line check			
Observer's seat only, or		N/A	N/A
All seats		BBD-700	05/01/2013
Optional functions when § 135.299 or § 135.293 is also approved			
	Aircraft Type(s)*		**Effective Date**
Section 135.293(a) written or oral test (Not used when check pilot has § 135.293 approval)	BBD-700 only		05/01/2013
Section 135.293(a)(1) and (4)–(8) written or oral test for pilots assigned to the following airplanes	G-V, CL-604, multiengine Cessna reciprocating-series airplanes		05/01/2013
Section 135.293(a)(1) and (4)–(9) written or oral test for pilots assigned to the following rotorcraft	S-76D, BHT-206, R-22		05/01/2013

N/A = Not approved

Please retain a copy of this letter in Mr. Smith's individual flight training records.

Sincerely,

James J. Jones
Principal Operations Inspector
Flight Standards Office (XXXX)

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Figure 3-20-6C. Check Pilot Approval Job Aid

1. Operator's Letter Contains Necessary Information:
[ ] Name of candidate.
[ ] Business address of candidate.
[ ] Flightcrew member duty position and aircraft type.
[ ] Check pilot classification and functions requested.
2. Training Records (Copies):
[ ] Initial, transition, or upgrade to requested aircraft and flightcrew member duty position.
[ ] Recurrent.
[ ] Check pilot training.
3. [ ] Résumé of Experience Included.
4. [ ] eVID, SPAS, and PTRS Verification Satisfactory.
5. [ ] Open eVID File.
6. [ ] Check Pilot Evaluation Scheduled.
7. [ ] Report of Evaluation Received From PTRS.
Favorable Report:
8. Prepare Letter of Approval:
[ ] Original letter to operator.
[ ] Copy to operator file.
[ ] Copy to other POI (if check pilot for another operator).
9. [ ] Update Operator eVID File.
10. [ ] Complete PTRS.
Unfavorable Report:
11. [ ] Prepare Letter to Operator Indicating Disapproval.
12. [ ] Update Operator eVID File. **13.** [ ] Complete PTRS.

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Figure 3-20-6D. Contract Instructor and Contract Check Pilot Nominee Training Records Affidavit

STATE OF _____

COUNTY OF _____

[Name of Applicant], being duly sworn, says:

1. On [today's date], I, [Name of Applicant], certify that I have been unable to find or obtain the training records documenting my completion of initial training with [name of air carrier/operator/program manager] on [date].

2. I acknowledge that any fraudulent or intentionally false statements concerning aeronautical experience are a basis for suspension or revocation of any certificate or rating I hold.

Considering the above, I offer the following statement in lieu of the actual records:

I, [Name of Applicant], hereby attest that I successfully completed initial training as a pilot for [name air carrier/operator/program manager], a 14 CFR part(s) [121/135/91K] [air carrier/operator/program manager] based in [city, state, country], on [date training completed].

_____

Airman's Signature

_____

Airman's Name (Printed) and Pilot Certificate Number

SUBSCRIBED AND SWORN TO before me this _____ day of _____, _____

[Seal]

Notary Public in and for

County_____

State of _____

My Commission expires on _____

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Figure 3-20-6E. Nominating Air Carrier/Operator Affidavit for Lost/Unobtainable Pilot Training Records

STATE OF _____

COUNTY OF _____

[Name of Company Representative], being duly sworn, says:

1. On [today's date], I, [Company Representative], [Company Name], certify that I have been unable to find or obtain the training records documenting that [Nominated Contract Check Pilot's Name] completed the initial training curriculum with [Company Name] on [date].

2. I have made a good faith effort to obtain such training records. Notwithstanding this effort, I have been unable to find such records. I do not know where such records presently are, or where they may be found. I believe them to be lost or destroyed.

3. I acknowledge that any fraudulent or intentionally false statements concerning aeronautical experience are a basis for suspension or revocation of any certificate or rating I hold, as well as revocation or suspension of this [air carrier certificate/operating certificate/management specifications].

For the above reason, I offer the below statement in lieu of the actual records:

I, [Company Representative], on behalf of [Company Name], attest the information above is accurate, and therefore [Name of Nominated Contract Check Pilot] meets the baseline requirements of a(n) [instructor/check pilot] as set forth in FAA Order 8900.1, Volume 3, Chapter 54, Section 5; and 14 CFR part(s) [91K/121/135].

Company Representative's Signature_____

Company Representative's Pilot Certificate Number (if applicable)_____

Company Representative's Name (Print)_____

Company Name and Certificate Number_____

SUBSCRIBED AND SWORN TO before me this _____ day of _____, _____

[Seal]

Notary Public in and for

County_____

State of _____

My Commission expires on _____

3-20-6-35 through 3-20-6-49 RESERVED.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 20 CHECK AIRMAN, INSTRUCTOR, AND SUPERVISOR PROGRAMS FOR TITLE 14 CFR PART 121 AND 135 CERTIFICATE HOLDERS

Section 7 Safety Assurance System: Part 135 Check Pilot and Air Transportation Flight Instructor Training

Source Basis:

- **Section 135.291, Applicability.**
- **Section 135.293, Initial and Recurrent Pilot Testing Requirements.**
- **Section 135.297, Pilot in Command: Instrument Proficiency Check Requirements.**
- **Section 135.299, Pilot in Command: Line Checks: Routes and Airports.**
- **Section 135.321, Applicability and Terms Used.**
- **Section 135.323, Training Program: General.**
- **Section 135.324, Training Program: Special Rules.**
- **Section 135.325, Training Program and Revision: Initial and Final Approval.**
- **Section 135.327, Training Program: Curriculum.**
- **Section 135.329, Crewmember Training Requirements.**
- **Section 135.337, Qualifications: Check Airmen (Aircraft) and Check Airmen (Simulator).**
- **Section 135.338, Qualifications: Flight Instructors (Aircraft) and Flight Instructors (Simulator).**
- **Section 135.339, Initial and Transition Training and Checking: Check Airmen (Aircraft), Check Airmen (Simulator).**
- **Section 135.340, Initial and Transition Training and Checking: Flight Instructors (Aircraft), Flight Instructors (Simulator).**
- **Section 135.341, Pilot and Flight Attendant Crewmember Training Programs.**
- **Section 135.351, Recurrent Training.**

3-20-7-1 GENERAL. This section provides guidance concerning the training requirements for check pilots and air transportation flight instructors. This section is related to Safety Assurance System (SAS) Element 2.1.2 (OP), Training of Check Airmen and Instructors.

3-20-7-3 PURPOSE. To provide inspectors guidance that supports the review and contents of instructor and check pilot training programs. The guidance will provide reference information that will assist the inspector in determining if the certificate holder develops and maintains a training program required by Title 14 of the Code of Federal Regulations (14 CFR) part 135, § 135.323 that ensures that each flight instructor and check pilot is adequately trained to perform his or her assigned duties. Prior to implementation, the certificate holder must obtain Federal Aviation Administration (FAA) approval of the respective training.

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3-20-7-5 INSTRUCTOR AND CHECK PILOT TRAINING OVERVIEW.

A. Instructor and Check Pilot Training. Instructors and check pilots are a primary pillar in the success of any training program. Without adequately trained and qualified individuals, the training program will not be successful. The applicant must devote the appropriate time and resources to the qualification and continuing qualification of these positions.

B. Development and Approval. The instructor and check pilot training and associated curricula will follow the same design philosophy of that development for the pilots found in Volume 3, Chapter 19.

C. Curricula Outlines. As with all training programs the associated curricula within contains an associated training outline. Specific to instructor and check pilot curricula, it must contain the information specified in Volume 3, Chapter 19, Section 2 and address all the requirements in §§ 135.339 and 135.340, as applicable. An overview of instructor or check pilot training requirements can be found in Figure 3-20-7A, Qualification and Training Requirements for Check Pilots and Flight Instructors.

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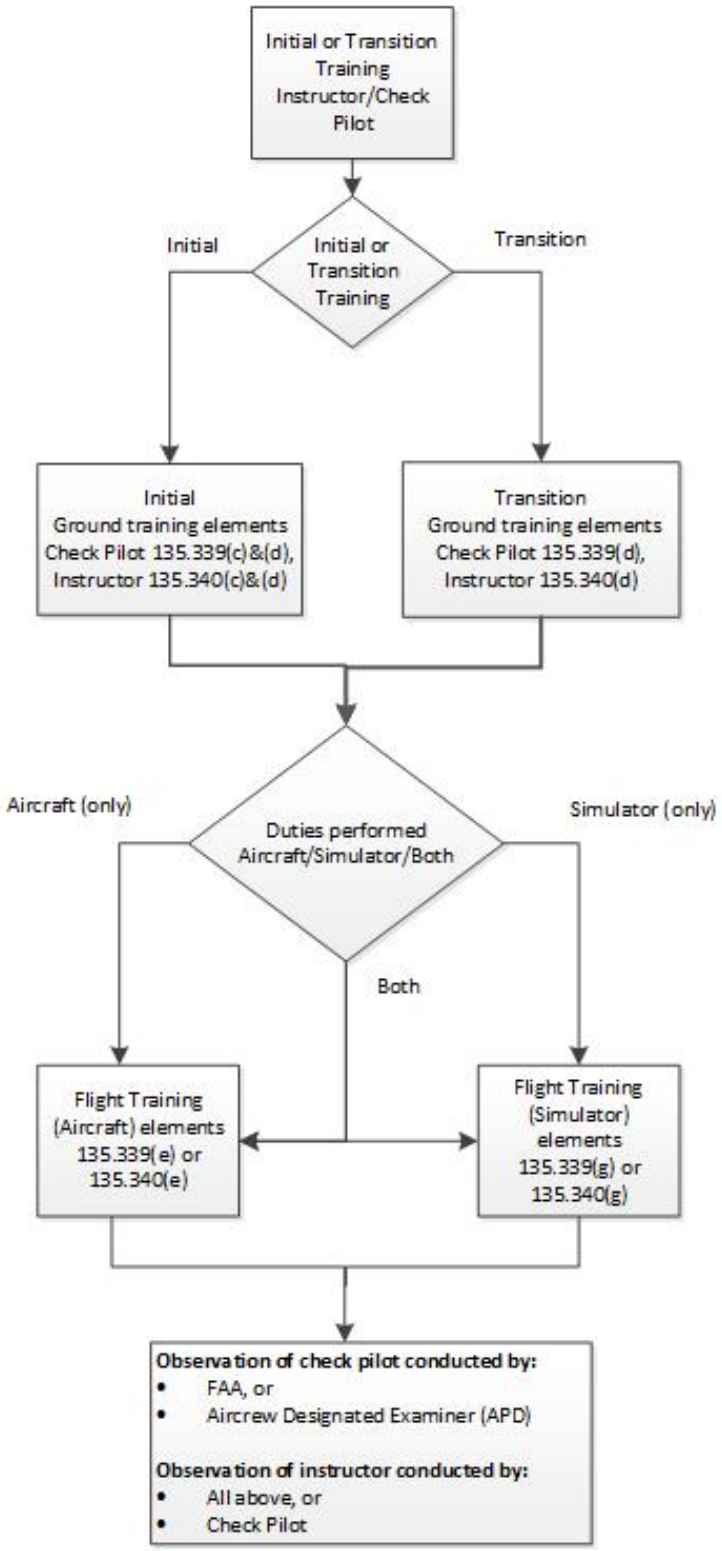
Figure 3-20-7A. Qualification and Training Requirements for Check Pilots and Flight Instructors



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D. Candidates: Selection of Instructors, and Nomination of Check Pilots. The operator selects instructors and submits the selections for review by the principal operations inspector (POI). The operator nominates check pilots and submits the nominees for approval by the POI. Because the experience levels of pilots vary among operators, it is impractical to specify minimum experience levels for candidates. In some cases, such as cases involving new operators, candidates may have relatively little flight experience. Regardless of experience levels, candidates must demonstrate high levels of knowledge and skill in the applicable job functions. POIs must ensure that adequate training for check pilots and air transportation flight instructors is completed and documented in the applicable records.

E. Single Pilot-in-Command (PIC) Operators. Operators using aircraft with a single PIC present questions about training that are not addressed in regulations. For such operators, a check pilot who performs competency and line checks may qualify and maintain currency by one of three methods:

1) The check pilot may receive competency and line checks from a check pilot from another operator or a training center approved by the operator's POI to conduct the air carrier's training;

2) If a Level B, C, or D full flight simulator (FFS) that replicates the aircraft being used is available and is approved for use in that operator's training program, the check pilot may receive competency checks in that FFS from a check pilot from another operator or training center approved by the operator's POI; or

3) The check pilot may receive competency and line checks from an FAA inspector.

3-20-7-7 TRAINING FOR FLIGHT INSTRUCTORS AND CHECK PILOTS. To ensure flight instructors are adequately trained, each operator's approved initial and transition flight instructor training program must include the training specified in §§ 135.338 and 135.340, as applicable. To ensure that its check pilots are adequately trained, each operator's approved initial and transition check pilot training program must include the training specified in §§ 135.337 and 135.339, as applicable. Check pilots and air transportation flight instructor candidates must satisfactorily complete the operator's approved initial, transition, or upgrade training programs for the desired aircraft and flightcrew member duty position. In addition, instructors must complete the operator's instructor training, and check pilots must complete the operator's instructor and check pilot training. If a flight instructor or check pilot has satisfactorily completed a curriculum segment in previous training that applies to more than one flightcrew member duty position or aircraft, it is not necessary to repeat that segment.

A. Ground Training.

1) Ground training for air transportation pilot flight instructors (including flight instructors using flight simulation training devices (FSTD)) and check pilots (including check pilots using FSTDs) must include the following topics:

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- Fundamental principles of the teaching–learning process,
- Teaching methods and procedures, and
- Instructor–student relationships.

2) Section 135.340(c)(7) provides that the aforementioned topics need not be included when the candidate holds a flight instructor certificate issued by the FAA. These regulations do not relieve the operator of the responsibility for ensuring that instructors, check pilots, remain proficient in these areas:

- Regulatory and administrative functions of instructors and check pilots, as appropriate;
- Applicable regulations;
- The operator's policies and procedures;
- Methods, procedures, and techniques for conducting required checks;
- Seat-dependent tasks for the specific aircraft;
- Analysis of flightcrew member performance, including identification of improper or insufficient training;
- Crew Resource Management (CRM) concepts and vocabulary;
- Appropriate corrective actions for unsatisfactory (UNSAT) performance in training or evaluation;
- Guidelines and safety measures for emergency situations likely to develop in conducting the required normal, abnormal, and emergency procedures in an aircraft and in an FSTD, as appropriate; and
- The consequences of improper or untimely safety measures.

B. Flight Training. Flight training for flight instructors—aircraft and check pilots—aircraft must include:

1) Enough flight training and practice in conducting training (and checks for check pilots) from the left and right pilot seats using the required normal, abnormal, and emergency procedures to ensure the individual's competency in conducting the required flight training (and pilot checks if applicable). For an air transportation flight instructor—aircraft and check pilot—aircraft, training, and practice in the takeoff and landing events of the operator's approved training program must be conducted in an aircraft; the remainder of the training may be conducted in an approved FSTD.

2) For check pilots—aircraft, training in-flight in an aircraft supervising normal takeoffs and landings from either pilot seat. The operator must ensure that the check pilot candidate is thoroughly trained in second-in-command (SIC) functions and capable of accomplishing them competently, while supervising and evaluating a new PIC.

3) Guidelines and safety measures for emergency situations likely to develop in conducting the required normal, abnormal, and emergency procedures in an aircraft.

4) The consequences of improper or untimely safety measures.

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C. Flight Training—Flight Instructor and Check Pilot who Conduct Training or Checking in an FSTD. Flight training for any flight instructor or check pilot who conducts training or checking in an FSTD must include:

1) Training and practice in conducting instruction and/or checks in the required normal, abnormal, and emergency procedures to ensure competence to conduct the flight instruction and/or checks required by part 135. This training and practice must be accomplished in an FSTD.

2) Training in the operation of each kind of FSTD to be used to ensure competence to conduct the flight instruction and/or checks required by part 135.

D. Check Pilot Training—Multiple Operators.

1) A POI may approve a check pilot to serve more than one operator. The POI can determine whether equivalent training completed with one operator may be credited toward the check pilot training requirement for another operator. Creditable training may include parts of ground training and flight training. For example, a check pilot might be eligible for training credit under the following conditions:

- Employed as a Training Center Evaluator (TCE) by a training center;
- Regularly performing proficiency, competency, or line checks;
- Using the same procedures for all operators; and
- The operators adopting common check pilot training programs.

2) When procedures, aircraft, or types of operations differ, the POI must require that the check pilot (for service with an additional operator) complete appropriate additional training. Appropriate additional training must address differences, and may comprise entire curriculum segments.

E. Check Pilot Training—Additional Functions. When additional check pilot functions are requested, the operator must ensure the respective training is provided to that check pilot.

F. Check Pilot Training—Optional Functions.

1) Training Evaluation. For operators requesting the additional optional check pilot functions for § 135.293(a) written or oral test and/or § 135.293(a)(1) and (4) through (9) written or oral test for multiple aircraft, as identified in Volume 3, Chapter 20, Section 5, paragraph 3-20-5-11, the POI must evaluate the adequacy of the additional training proposed with emphasis on:

- The additional check pilot duties, functions, and responsibilities associated with § 135.293(a) authority specific to those pilots to be checked;
- The applicable 14 CFR provisions, operators' policies, procedures, and operations specifications (OpSpecs);

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- The operator's applicable methods, procedures, and techniques for conducting the required checks; and
- Proper evaluation of student performance including the detection of improper and insufficient training and use of corrective action in the case of UNSAT checks.

2) Operational Differences.

a) The operator's check pilot training must address how a check pilot who does not hold the same type rating as the pilot being checked will conduct the oral/written test. The training and associated procedures the operator develops must address operational differences for all pilots the check pilot will be evaluating. In addition to the above requirements, the training must address critical differences, such as but not limited to:

- Applicable regulatory OpSpecs and relevant manual differences (e.g., domestic and international operations, and approach authorizations);
- Navigational differences between aircraft operations and types;
- Differences in air traffic control (ATC) procedures that may be used by the various aircraft;
- Differences associated with high-altitude operations;
- New equipment, procedures, or techniques as appropriate; and
- Other items deemed appropriate by the POI or operator.

b) Because of the potential for a wide variation in the fleet composition of an operator, the associated training that a check pilot would require could be equally diverse. The scope and breadth of training will be dependent upon the operator's fleet diversity and the associated check pilot's functions and limitations. For example, an operator may request that the check pilot administer knowledge tests to pilots of other aircraft (§ 135.293(a)(1) and (4) through (8)) that are similar in operational characteristics (e.g., Global Express and a G-V pilot or between a Lear Jet and Hawker). In such a case, the training scope and depth would be limited. Conversely, the check pilot training required to conduct a § 135.293(a)(1) and (4) through (9) to a G-V pilot and the operator's helicopter pilots or reciprocating engine aircraft would be more complex. The POI and the operator must conduct a thorough review to determine the necessary training scope and depth.

c) Due diligence is required on the part of an operator and during review of the check pilot training to ensure that the check pilot is adequately trained to perform his or her duties. To establish a clear understanding of the training requirements, POIs should discuss these points with the operator to ensure that each check pilot is adequately trained to perform their assigned duties.

3-20-7-9 LINE OBSERVATION PROGRAM. The preferred method of compliance with the requirements of §§ 135.337(f), and 135.338(f) is to have flight instructors and check pilots fly a minimum of two flight segments during actual line operations in the aircraft. In lieu of actual line flying, flight instructors and check pilots can complete an approved line observation program. There are two types of line observation programs that a POI may approve: line observation from the observer's seat or a Line-Experience Module (LEM) program.

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A. Line Observation from the Observer's Seat. A certificate holder may comply with §§ 135.337(f)(2) and 135.338(f)(2) by requiring flight instructors and check pilots to complete line observation from the observer's seat. Prior to approving this type of line observation program, POIs must ensure the certificate holder's proposed program requires each flight instructor and check pilot to complete a minimum of two flight segments in the observer's seat within each 12-month period.

B. Line-Experience Module (LEM). For the purpose of meeting the LEM requirements in an FSTD, the following guidance should be utilized. The design of LEM contains many of the characteristics and attributes of Line Operational Simulation that is described in the current edition of AC 120-35, Flightcrew Member Line Operational Simulations: Line-Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation, and at the same time is unique in that it is designed to supplement those instructors and check pilots unable to conduct an observation from an observer's seat. The training session is conducted in a "line environment" setting designed to afford the instructor or check pilot the opportunity to experience line operation similar to that of a line pilot. The LEM provides an environment that allows the benefits of real-time simulation experience and participation as a line crewmember. Instruction and training is based on learning objectives, behavioral observation, and assessment of performance progress and instructor or check pilot debriefing or critique (feedback). The training objectives with LEM are proficiency objectives that include both technical and CRM elements. In an LEM aircrew technical and CRM performance are evaluated and reviewed during the debriefing. This reinforces the skills and knowledge associated with the instructor and check pilot assessment of a trainee. The associated maneuvers and procedures that are defined in the other segments of the air carriers training program should be fully integrated in the LEM. POIs must ensure the certificate holder's proposed program requires each flight instructor and check pilot to complete the LEM Program in accordance with §§ 135.337(f) and 135.338(f) as applicable.

1) Approval. A certificate holder may comply with §§ 135.337(f)(2) or 135.338(f)(2) by conducting an LEM program. Prior to approving an LEM program, POIs must ensure the certificate holder's proposed program includes the following concepts and elements in addition to elements that are unique to the certificate holder's operations.

2) Ground Training. Ground training must include the following subjects:

a) Clearances. Duties of a check pilot or flight instructor with regards to the use of ATC clearances in a training environment.

- Format of clearances to accurately simulate ATC.
- Ability to provide timeliness of responses typical of controllers.
- Using clearances accurately to create a more realistic scenario in the training environment.
- Accurately providing realistic clearances to enhance instructor credibility and professionalism.
- Using clearances accurately to simulate correct ATC spacing and controller knowledge of aircraft system performance parameters.

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b) Terminology.

- Common ATC terminology variations.
- International language and terminology considerations (if applicable).
- Realistic use in the training environment.

c) Vectoring. Appropriate use and training benefits/pitfalls.

- Commonly misused vectoring practices.
- Training benefits and importance of correct vectoring to preserve realism.
- Negative training and associated impact of inaccurate or unrealistic vectors/practices.

d) International Civil Aviation Organization (ICAO) Differences. Applicable for those certificate holders that provide instruction for international operations.

- Variations between FAA and ICAO terminology.
- Foreign airport training and practices.
- Transition altitudes.

e) Runway/Taxiway Signage, Surface Movement Guidance and Control System (SMGCS), etc.

- Recent changes in signage and markings.
- Large airports/small airport variances.
- Runway markings.
- Taxiway markings.
- Ground and approach lighting systems.
- SMGCS: who must comply, under what weather conditions it applies, and how to comply with clearances and procedures (if applicable).

3) Flight Training. Training must be conducted in an FFS and will be designed as an LEM event intended to provide replication of operations within the National Airspace System (NAS) with emphasis on the crew's interaction and functions. It must be designed to realistically simulate (within the limitations of flight simulator technology) a view of the ATC environment that flightcrews may encounter when operating in the NAS. Flight training must include the following events, as applicable, that are tailored to reflect the operational environment of the certificate holder:

- Normal operations;
- ATC normal, abnormal, and emergency operations;
- Low-visibility taxi and takeoff (use of enhanced taxiway markings and ATC interactions);
- Short approach request;
- Tailwind landing request <10 knots;
- Speed restrictions and expedite requests (e.g., 180 knots to the marker);

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- Expedite to an altitude (may be up or down);
- Unexpected clearance to a new fix (flight management system (FMS) exercise);
- Visual approach;
- Special approaches (e.g., Required Navigation Performance (RNP) subject to special requirement, Localizer Performance with vertical guidance (LPV), and precision runway monitor (PRM));
- Traffic alert;
- Traffic Alert and Collision Avoidance System (TCAS) alert;
- Uncontrolled field approach;
- Special airport operation;
- Special route authorizations;
- RNP approaches and departures;
- Equipment failures affecting navigation reliability; and
- Other events that the operator may deem appropriate.

4) Line Observation Program Training Schedule. The certificate holder must develop sufficient LEM scenarios to ensure flight instructors and check pilots do not repeat the same scenario within four training cycles as defined within their approved training program. If the ground and flight training segments occur more than 30 days apart, then the operator must maintain a separate tracking record for each segment. Each segment will then have its own 12-month currency cycle.

C. Line Operations and CRM. The essential areas that should be presented during an FFS LEM should include a NAS-like environment and associated CRM-related skill assessment that emphasizes communications, decision making, team building and maintenance, workload management, and situational awareness, in addition to maintaining traditional technical proficiency. Teaching and evaluating specific observable actions that are required in the execution of specific activities at designated points during normal flight operations, as well as during abnormal or emergency conditions, can enhance the crew's ability to communicate effectively, plan, and manage their workload, and solve problems during flight operations. Many aspects of CRM can be supported by the demonstration of standard operating procedure (SOP), which increases CRM's operational significance and provides crews with a standard form of CRM. CRM procedures are typically embedded in a range of crew activities through the different phases of flight, reducing distractions to the Pilot Flying (PF) in both normal and abnormal situations. Also, providing structure to briefings with a checklist format can enhance the crew's performance and improve the transfer of critical information. Refer to the current edition of AC 120-51, Crew Resource Management Training, for methods in developing and evaluating CRM behaviors.

3-20-7-11 through 3-20-7-25 RESERVED.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 27 GROUND DEICING/ANTI-ICING PROGRAMS

Section 1 Safety Assurance System: General

3-2166 REPORTING SYSTEM(S).

A. Program Tracking and Reporting Subsystem (PTRS). For Title 14 of the Code of Federal Regulations (14 CFR) part 125, use PTRS activity codes 1310, 3311, and 5311.

B. Safety Assurance System (SAS). For 14 CFR parts 121 and 135, use SAS automation and the associated Data Collection Tools (DCT).

3-2167 BACKGROUND. Section 1 of this chapter contains background information on ground deicing/anti-icing of aircraft. Section 2 provides policy, direction, and guidance to Federal Aviation Administration (FAA) inspectors for evaluation and approval of operator procedures. Volume 6, Chapter 2, Section 15, of this handbook covers ground deicing/anti-icing surveillance procedures.

A. Requirements. There are essential differences in the ground deicing/anti-icing requirements of 14 CFR parts 121, 125, and 135. For example, part 121 requires a complete deicing/anti-icing program that includes the training and testing of all personnel involved in the ground deicing/anti-icing process. On the other hand, part 135 requires training and testing for pilots only. Additionally, if a part 135 operator chooses to use personnel other than pilots to assist in the ground deicing/anti-icing and verification process, then those individuals must receive adequate and appropriate training. Part 125 requires testing for pilots only; however, other personnel involved in the deicing/anti-icing process must receive adequate and appropriate training.

B. Deicing/Anti-Icing Program. Parts 125 and 135 operators have the option to elect to meet the deicing/anti-icing requirements of part 121, § 121.629(c) and institute a full deicing/anti-icing program. Recognizing that most inspectors will be required to inspect a variety of aircraft and operators, this chapter will attempt to present the differences in a meaningful manner. The inspector should become thoroughly familiar with the differences and requirements in 14 CFR covering operations in icing conditions.

3-2168 RULE. The current regulations in parts 121, 125, and 135 prohibit a takeoff when frost, ice, or snow (contamination) is adhering to the wings, control surfaces, or propellers of an airplane (see § 121.629(b), part 125, § 125.221(a), and part 135, § 135.227(a)). Traditionally, the pilot in command (PIC) has been held responsible for ensuring that critical surfaces of the aircraft are free of adhering frozen contaminants before takeoff. By the winter of 1991, an analysis of air carrier accidents led the FAA to conclude that many PICs had not been provided with sufficient information to ensure that the aircraft is free of frost, ice, and snow. Part 121 was amended in November 1992, and parts 125 and 135 were amended in January 1994 to provide specific rules for operating (that is, taking off) in weather conditions when frost, ice, or snow could reasonably be expected to adhere to the aircraft (ground icing conditions).

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3-2169 PART 121 GROUND DEICING/ANTI-ICING.

A. General. Section 121.629(b) prohibits takeoff when contamination is adhering to critical surfaces of an airplane or when takeoff would not be in compliance with § 121.629(c). The exception to that general rule is that the Administrator may approve takeoff with "frost under the wing in the area of the fuel tanks." Section 121.629(c) requires a detailed, comprehensive, deicing/anti-icing program (part 121 ground deicing program) if a certificate holder is going to operate "any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the aircraft" (ground icing conditions). Section 121.629(d) provides a means for a certificate holder to operate without a program as required in § 121.629(c). If the operator does not have an FAA-approved deicing/anti-icing program, § 121.629(c) prohibits an air carrier from "dispatch, release, or takeoff" of an aircraft in ground icing conditions.

NOTE: Principal operations inspectors (POI) may refer to Advisory Circular (AC) 120-60, Ground Deicing and Anti-Icing Program, for a detailed description of those elements that make up the program.

B. Provisions and Exceptions. An exception to the requirements for a complete deicing/anti-icing program is contained in § 121.629(d), which provides that an air carrier is not required to have an approved deicing/anti-icing program if an Outside-the-Aircraft Check (OTAC) is completed within 5 minutes prior to beginning the takeoff. An OTAC must be performed from outside the aircraft to ensure that "wings, control surfaces, and other critical surfaces are free of frost, ice, and snow" when the certificate holder is operating in ground icing conditions. If a certificate holder chooses to operate in accordance with § 121.629(d), the requirement for an OTAC must be documented in its operations specifications (OpSpecs).

3-2170 PART 121 DEFINITIONS.

A. Pretakeoff Check. A pretakeoff check is a check of the aircraft's wings or representative aircraft surfaces for frost, ice, or snow within the aircraft's holdover time (HOT). This check is required when the certificate holder operates (that is, intends to takeoff) in ground icing conditions, the aircraft has been deiced/anti-iced, and a HOT is established. This check is accomplished within the HOT range and is normally accomplished by the flightcrew from inside the cockpit. The pretakeoff check requires the flightcrew to check the aircraft's wings or representative aircraft surfaces for contamination as well as to assess the current weather or other situational conditions. The pretakeoff check is integral to the use of HOTs. If HOTs are used, at least one pretakeoff check must be performed.

B. Pretakeoff Contamination Check.

1) A pretakeoff contamination check is a check that the flightcrew and ground personnel conduct after the HOT has been exceeded to make sure that the wings, control surfaces, and other critical surfaces, as defined in the operator's program, are free of frost, ice, and snow. The pretakeoff contamination check must be completed within 5 minutes before beginning the takeoff. Operators must have aircraft-specific procedures for use by flightcrew members and qualified ground personnel while conducting the check to ensure that the aircraft's

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wings, control surfaces, and other critical surfaces remain free of frost, ice, or snow when a HOT has been exceeded.

2) The pretakeoff contamination check must be conducted from outside the aircraft for the following:

- Hard-wing airplanes with aft, fuselage-mounted, turbine-powered engines.

NOTE: The check for these airplanes must include a tactile check of selected portions of the wing-leading edges and the upper wing surfaces. Alternatives to a tactile check may be approved only with concurrence of the manager of the Air Transportation Division (AFS-200).

- For all other airplanes, unless the operator shows that the check can be adequately accomplished from inside the airplane. POIs may refer to AC 120-60 for additional guidance.

C. OTAC. An OTAC is a check that must be accomplished from outside the aircraft. Section 121.629(d) requires an OTAC of a certificate holder who operates in ground icing conditions without an approved part 121 ground deicing/anti-icing program. For those operators without an approved program, any time frost, ice, or snow may reasonably be expected to adhere to the aircraft, an OTAC must be performed to ensure that the wings, control surfaces, and other critical surfaces are free of contamination. An OTAC must occur within 5 minutes prior to beginning the takeoff.

D. HOT. HOT is the estimated time deicing/anti-icing fluid will prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aircraft. HOT begins when the final application of deicing/anti-icing fluid commences and expires when the deicing/anti-icing fluid applied to the aircraft loses its effectiveness.

3-2171 PART 121 GROUND DEICING/ANTI-ICING PROGRAM. In order for the certificate holder to have an approved ground deicing/anti-icing program that complies with § 121.629(c), each operator's ground deicing/anti-icing program must cover the following four areas as described in AC 120-60:

- Management plan detailing operational responsibilities and procedures;
- Holdover timetables and procedures for their use;
- Procedures and responsibilities for aircraft ground deicing/anti-icing, pretakeoff check, and pretakeoff contamination check procedures; and
- Initial and recurrent ground training and/or testing for flightcrew members and qualification for all other affected personnel, as applicable.

3-2172 MANAGEMENT PLAN. The operator should develop, implement, and use a management plan to ensure proper execution of its approved deicing/anti-icing program. The management plan should include operations and maintenance responsibilities and identify the management positions that are responsible for ensuring that all necessary elements of the deicing/anti-icing program are properly executed.

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3-2173 HOLDOVER TIMETABLES AND THE PROCEDURES FOR THEIR USE.

A. Holdover Timetables. Each operator is required to develop, and have available, holdover timetables for use by its personnel. In addition, each operator must make its holdover timetables available for use in the cockpit. These timetables are required to be supported by data acceptable to the Administrator. Currently, the only acceptable data are those developed by the Society of Automotive Engineers (SAE) and International Organization for Standardization (ISO). Aerospace Recommended Practice (ARP) 4737, Aircraft Deicing/Anti-Icing Methods, and ISO 11076, Aircraft Deicing/Anti-icing Methods on the Ground, contain the tables that are currently considered acceptable for use by the operators to develop their timetables.

NOTE: POIs may refer to AC 120-60 for additional guidance regarding the development of procedures for increasing or decreasing determined HOTs.

B. Takeoff Within a HOT. If takeoff is conducted within the HOT, § 121.629(c)(4) requires at least one pretakeoff check of the wings or representative surfaces to be completed by the flightcrew within the HOT range prior to the takeoff. Operator's manuals should contain detailed procedures regarding the use of the timetables in their operations. Section 121.629(c)(3) requires that the operator's program contain procedures for the flightcrew members to increase or decrease the determined HOT in changing weather conditions.

C. Takeoff After the HOT Is Exceeded. Under § 121.629(c), takeoff after the HOT is exceeded is permitted only if one or more of the following actions have been taken:

1) A pretakeoff contamination check is made to ensure that wings, control surfaces, and other critical surfaces, as defined in the certificate holder's program, are free of frost, ice, or snow.

2) It is otherwise determined by an alternative procedure, which was developed by the operator and approved by the FAA (for example, wing-icing sensors) that the wings, control surfaces, and other critical surfaces as defined in the certificate holder's program, are free of frost, ice, or snow.

3) The wings, control surfaces, and other critical surfaces have been re-deiced and a new HOT has been established.

3-2174 PART 135 GROUND DEICING/ANTI-ICING TRAINING AND CHECKING RULE.

A. General. Section 135.227(a) prohibits a pilot from taking off in an aircraft that has "frost, ice, or snow adhering to any rotor blade, propeller, windshield, wing, stabilizing or control surface, to a powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system..." As evident by the use of the term rotor blade, helicopters are subject to the regulation. There is one exception to the regulation: Section 135.227(a) allows that "takeoffs may be made with frost under the wing in the area of the fuel tanks if authorized by the Administrator."

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B. Provisions in Part 135 Ground Deicing/Anti-Icing Rule. Section 135.227(b) requires pilot training in accordance with § 135.341 if a certificate holder is going to operate (that is, takeoff) "any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane..." (ground icing conditions). In addition to pilot training, § 135.227 requires a pretakeoff contamination check (see paragraph 3-2175). Therefore, if the certificate holder is operating in ground icing conditions, it must have a pilot training program, which the pilot has completed, in accordance with § 135.341 and the pilot must conduct a pretakeoff contamination check. Exceptions to the regulation that requires a pretakeoff contamination check when operating in ground icing conditions are as follows:

1) Administrator may approve an alternative procedure developed by the operator to ensure the wings and control surfaces are free of contamination (for example, wing icing sensors); or

2) The operator may comply with the part 121 ground deicing rule.

C. Important Differences Between the Part 121 Ground Deicing Rule and the Part 135 Ground Deicing Rule. When compared to the part 121 ground deicing regulation, the part 135 ground deicing rule differs in the following respects:

1) Only pilot training and checking is required to be conducted in accordance with § 135.345(b)(6)(iv).

2) The use of HOTs and holdover timetables when operators use deicing/anti-icing fluids is only advisory in the part 135 ground deicing rule.

3) A pretakeoff contamination check must be performed whenever a part 135 certificate holder is operating in ground icing conditions.

3-2175 PRETAKEOFF CONTAMINATION CHECK. A pretakeoff contamination check is a check to make sure the wings and control surfaces are free of frost, ice, or snow. Section 135.227 requires that a pretakeoff contamination check be completed within 5 minutes prior to beginning the takeoff. It may be accomplished from inside or outside the aircraft and may be visual, tactile, or a combination, as long as the check is adequate to ensure the absence of contamination. The operator's POI must approve the pretakeoff contamination check procedures for each specific type of aircraft operated by the certificate holder. Also, the operator's OpSpec A023 or A041, as applicable, must reference or describe the pretakeoff contamination check.

3-2176 APPROVALS FOR PART 135 OPERATORS. If a part 135 operator chooses to use a ground deicing/anti-icing program (§ 121.629(c)), the POI will issue OpSpec A023 to approve that program. If a part 135 operator chooses not to use a ground deicing/anti-icing program, the POI will issue OpSpec A042. The POI will authorize a pretakeoff contamination check by issuing OpSpec A041, in accordance with § 135.227 (see Volume 3, Chapter 18, Section 3).

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3-2177 APPLICABILITY OF THE PART 135 GROUND DEICING RULE.

A. Certificate Holder Who Does Not Operate in Ground Icing Conditions. The part 135 ground deicing rule does not apply to a certificate holder who does not operate in ground icing conditions. Under the regulation, ground icing conditions exist any time weather conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane. The certificate holder who does not operate in ground icing conditions is not required to train its pilots or develop pretakeoff contamination procedures. Certificate holders who do not operate in ground icing conditions must be issued OpSpec A042.

B. Operators Who Use Only One Pilot in Their Operations. Operators who use only one pilot in their operations (single-pilot operator) are not required to comply with the manual and approved training requirements of § 135.21 or § 135.341. Therefore, single-pilot operators are not required to have an approved pilot training program nor the additional training required by the part 135 ground deicing rule. However, single-pilot operators must comply with all the operational requirements of the part 135 ground deicing rule. Those operational requirements include a pretakeoff contamination check or an approved alternative procedure to the pretakeoff contamination check described in its OpSpecs. The pilots of these types of operators will need to demonstrate knowledge to operate in ground icing conditions during the initial and recurrent flight checks. A single-pilot operator will have an aircraft specific description of the pretakeoff contamination check in OpSpec A023 or A041, as applicable. If the operator does not operate in ground icing conditions, OpSpec A042 must be so documented and issued.

C. Helicopter Operations. Helicopter operations conducted under part 135 are excluded from the additional training and pretakeoff contamination check requirements of the part 135 ground deicing rule. However, the regulation requires helicopter operations to be conducted in accordance with the operating limitations of § 135.227.

3-2178 TRAINING REQUIREMENTS OF THE PART 135 GROUND DEICING RULE. If an operator is required to have an approved training program, that training program must include pilot ground training relating to deicing and anti-icing operations required by § 135.345 for initial, transition, and upgrade training and by § 135.351 for recurrent training and testing. These training requirements must include procedures for operating airplanes during ground icing conditions. The operator must provide that training to its pilots and all other participating personnel. The training must include at least the following elements:

A. Use of HOTs. In part 135 operations, HOTs are only advisory and serve as guidance to the pilot in making takeoff decisions. If the operator uses the deicing/anti-icing fluids, it must train its pilots in the use of HOTs.

B. Airplane Deicing/Anti-Icing Procedures. Airplane deicing/anti-icing procedures include responsibilities, requirements, and inspections and check procedures for the pretakeoff contamination check or alternative procedures, as applicable.

C. Communications. The operator must provide training for all company personnel in communicating with all agencies involved in the deicing/anti-icing process and the decisionmaking process.

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D. Contamination. Aircraft surface contamination training includes how to identify frost, ice, or snow, and how to locate critical areas. Training should include an explanation of how small amounts of surface contamination adversely affect aircraft performance and flight characteristics.

E. Deicing/Anti-Icing Fluids. If the operator uses deicing/anti-icing fluids, it must train its pilots, as well as any other participating personnel, in the types and characteristics of deicing/anti-icing fluids.

NOTE: It is important that flightcrews do not use deicing/anti-icing fluids unless they have been trained in the characteristics and effects of these fluids on their operation.

F. Cold Weather Preflight Inspection Procedures. Training should include procedures for cold weather preflight inspections.

G. Contamination Recognition. This aspect of training should cover techniques for recognizing contamination on the aircraft for use during both the preflight inspection and the pretakeoff contamination check.

NOTE: All training should be aircraft specific. When an operator has different kinds of aircraft, any unique characteristics of these aircraft while operating in ground icing conditions should be covered.

NOTE: Other than part 135 single-pilot operators, who must have the pretakeoff contamination check procedures described in their OpSpecs, both parts 121 and 135 operators must have documentation in their general manuals (GM) or flight manuals (fm) for the procedures they intend to use to comply with their respective deicing/anti-icing rule. These procedures may include descriptions of how and by whom the pretakeoff contamination check will be accomplished, and how the operator will comply with its approved deicing/anti-icing procedures. If an operator elects to not fly when frost, ice, or snow may reasonably be expected to adhere to the surface of an aircraft, that operator's manuals should contain specific guidance to that effect. This guidance should caution flightcrew members that this operator does not have deicing/anti-icing procedures in effect and does not authorize takeoff during ground icing conditions.

NOTE: Inspectors should use this handbook section for background material when reviewing those sections of operator's manuals and procedures concerning ground deicing/anti-icing.

3-2179 SOURCES OF INFORMATION. The following publications (current editions) may be useful to inspectors and operators for developing, reviewing, and approving a ground deicing/anti-icing program.

A. AC 20-117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing. This AC contains useful background information and

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also contains an extensive bibliography of related FAA and private sector publications, training materials, and other deicing/anti-icing or related information.

B. AC 120-60, Ground Deicing and Anti-Icing Program. This AC contains information on how operators may develop acceptable ground deicing/anti-icing programs to comply with § 121.629(c).

C. AC 135-16, Ground Deicing and Anti-Icing Training and Checking. This AC contains information on how operators may develop acceptable ground deicing/anti-icing programs to comply with § 135.227.

D. AC 120-58, Pilot Guide Large Aircraft Ground Deicing.

E. Computer-Based Instruction (CBI) Programs. The following are available through the electronic Learning Management System (eLMS):

- Course 27019–Ground Deicing/Anti-Icing for Airworthiness Inspectors.
- Course 27020–Ground Deicing/Anti-Icing for Operations Inspectors.

F. Winter Operations Guidance for Air Carriers. This publication contains a number of ACs and articles relevant to the topic. Specific publications are listed here in case they need to be obtained and used separately:

- AC 00-45, Aviation Weather Services.
- AC 20-73, Aircraft Ice Protection.
- AC 23.1419-2, Certification of Part 23 Airplanes for Flight in Icing Conditions.
- AC 65-15, Airframe and Powerplant Mechanics Airframe Handbook (refer to Chapter 7, Ice and Rain Protection).
- AC 91-74, Pilot Guide: Flight in Icing Conditions.
- AC 91-79, Mitigating the Risks of a Runway Overrun Upon Landing.
- AC 120-42, Extended Operations (ETOPS and Polar Operations).
- AC 135-9, FAR Part 135 Icing Limitations.
- AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.
- FAA P-8740-24, Winter Flying Tips.

RESERVED. Paragraphs 3-2180 through 3-2193.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 27 GROUND DEICING/ANTI-ICING PROGRAMS

Section 3 Safety Assurance System: Other Means of Deicing/Anti-Icing

3-2216 REPORTING SYSTEM. Use Safety Assurance System (SAS) automation and the associated Data Collection Tools (DCT).

3-2217 GROUND DEICING USING INFRARED (IR) ENERGY.

A. Background. Given the cost of deicing with conventional fluids and the recent demand for alternative deicing methods, interest in IR deicing systems has increased. IR energy has been used by the industrial and domestic heating industry for several decades. Studies have shown that, when used properly, IR energy has no harmful effects on humans or animals. Federal Aviation Administration (FAA) tests, conducted under a Cooperative Research and Development Agreement (CRDA), have also demonstrated that IR energy does not pass through the aircraft surfaces and has a negligible effect on cabin internal temperature. The FAA encourages the development and use of alternative methods of deicing such as IR systems. However, as with all deicing equipment, it is necessary to ensure that IR deicing systems are used with the highest degree of competence and safety. Consequently, the FAA has developed the general safety criteria in Advisory Circular (AC) 120-89, Ground Deicing Using Infrared Energy, for certificate holders to use to evaluate IR deicing systems for use in a certificate holder's approved deicing/anti-icing program.

B. Related Documents (current editions).

1) FAA Publications. The following ACs are available at https://www.faa.gov/regulations_policies/advisory_circulars/.

- AC 120-60, Ground Deicing and Anti-Icing Program.
- AC 120-89, Ground Deicing Using Infrared Energy.
- AC 150/5300-14, Design of Aircraft Deicing Facilities.

2) Safety Studies.

- Ocular Effects of Radiation, D. Cogan, AMA Archives of Industrial Health, Vol. 20, No. 4, pp. 293–296, 1959.
- Basic Principles of Ventilation and Heating, T. Bedford, et al., H. K. Lewis Company, Ltd., 1948.

C. Use of IR Systems.

1) IR Emitter Units. IR energy can be produced in a number of ways. The method most commonly used for deicing is a gas-fired IR system. This system uses gas-fired units suspended from the ceiling of the modular shelter facility. These units are controlled by an onsite operator located at a control station within the facility. The system can be instantly turned off using emergency shutdown buttons located either at the control station or around the facility.

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2) How an IR System Deices Aircraft.

a) Critical Aircraft Surfaces. Unlike heated hangars where convection heat energy is generally distributed, IR energy does not heat the air that it passes through. The energy is concentrated on specific areas. When deicing, the IR emitter units impart sufficient IR-focused energy on the aircraft surfaces in line-of-sight of the IR units to melt the frozen contaminants on those surfaces.

b) Aircraft Underbody. If the energy does not reach the underbody of the aircraft, including the landing gear, ice could be retained at these locations even though the upper parts of the aircraft are free of ice contamination. In situations where the underbody is clean, it could be possible under certain conditions, for water to refreeze on parts of the underbody as it runs off of the wing and other upper portions of the aircraft. However, heat always seeks a balance with surrounding areas and always moves from the warmer medium to the cooler medium. In-service experience has demonstrated that some of the heat energy reflected by the facility structure, in addition to the heat energy which is absorbed by the ground before the aircraft arrives, will re-radiate to the colder underwing and landing gear surfaces to remove frozen contamination. As with all deicing methods, the certificate holder is responsible for performing a post-deicing inspection of these areas to ensure that all frozen contamination has been removed.

3) Size of IR Deicing Facilities. These systems have been used to deice commuter and moderate-sized (e.g., B757) aircraft. Systems capable of deicing large aircraft (e.g., B747) may also be available.

4) Use of Deicing Fluid with IR Systems. Deicing fluid can be used in conjunction with IR energy in cases where water refreezes on part of the airplane not exposed to IR energy.

5) Responsibilities of Flightcrews. As with all deicing methods, when an aircraft is deiced using an IR facility, it remains the responsibility of flightcrews to assure that all contamination has been removed from the aircraft and that no further contamination is likely to occur before takeoff.

6) Deicing and Anti-Icing. An IR system is used to deice an aircraft. An IR system does not function as an anti-icing agent. No holdover times (HOT) exist for IR energy. Anti-icing fluids may be used in conjunction with an IR system, after an aircraft has been deiced, if the aircraft is expected to operate in active ground icing conditions. If contamination is likely to occur after IR deicing and the facility includes the application of an anti-icing freezing point depressant (FPD), the IR facility operator's use of the FPD must comply with the requirements of Title 14 of the Code of Federal Regulations (14 CFR) part 121, § 121.629(c).

D. Approval Criteria. The FAA does not certificate IR deicing facilities. Therefore, a certificate holder who wishes to use an IR facility should confirm that the IR facility meets the criteria of AC 120-89, or provide an alternative means acceptable to the FAA of assuring the operational safety of the deicing facility, with supporting documentation, before including that IR facility in its program/plan. Using IR energy to deice airplanes can be part of any certificate holder's deicing/anti-icing program/plan regardless of whether the certificate holder is operating under 14 CFR part 121, 125, or 135.

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1) Along with the guidance in Volume 3, Chapter 27, Section 2, principal operations inspectors (POI) should consider the follow criteria before approving the use of an IR facility as part of a certificate holder's ground deicing program. The certificate holder must show the POI that the IR facility addresses these criteria.

a) The IR facility operator should provide an appropriate description of the system (e.g., hardware, energy source, and markings).

b) The IR deicing system should perform its intended purpose (i.e., it must be capable of effectively deicing an aircraft).

c) The IR deicing systems should not create a hazard to:

- Aircraft,
- Ground personnel,
- Crewmembers,
- Passengers,
- Cargo, or
- Airport facilities.

NOTE: IR energy has no effect on Navigational Aids (NAVAID), antennas, communication facilities, and building as it is in a different area of the electromagnetic spectrum. However, the systems location (as with any airport structure) should be approved with regards to tower sightlines and runway obstacle free areas, etc. This is normally accomplished by the local airport authority in their applications to the FAA.

NOTE: The FAA requires that IR aircraft ground deicing facilities be designed to operate with the IR energy source positioned at least 10 feet away from the aircraft surface.

d) Any IR system for approval should be in general agreement with the appropriate industry standards, as created by groups such as SAE International and the International Organization for Standardization (ISO), and should conform to the applicable FAA documents.

e) Any process for approving the operational use of an IR system should follow established guidelines set by industry groups, such as SAE International, ISO, Airlines for America (A4A), the International Civil Aviation Organization (ICAO), and the General Aviation Manufacturers Association (GAMA). These guidelines should address:

- The training of flightcrew, IR equipment ground operator personnel, facility maintenance personnel, and anti-icing ground personnel.
- Melted ice flowing into aerodynamically quiet areas and refreezing (SAE ARP4737, Aircraft Deicing/Anti-Icing Methods).
- Additional deicing and anti-icing requirements.
- Environmental considerations.

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f) Notification must be obtained from the aircraft manufacturer that the IR energy can safely be used on composite aircraft surfaces.

2) Once a certificate holder has determined that the IR deicing system to be used by a deicing facility meets these criteria, the certificate holder should present its findings to the POI for review. Once the POI determines from the findings presented that the IR deicing system meets all criteria, the system may become part of the certificate holder's deicing/anti-icing program.

RESERVED. Paragraphs 3-2218 through 3-2235.

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VOLUME 3 GENERAL TECHNICAL ADMINISTRATION

CHAPTER 27 GROUND DEICING/ANTI-ICING PROGRAMS

Section 4 Safety Assurance System: Maintenance Inspector Responsibilities—Evaluate an Operator's Deicing/Anti-Icing Program

3-2236 REPORTING SYSTEM(S).

A. Program Tracking and Reporting Subsystem (PTRS). For Title 14 of the Code of Federal Regulations (14 CFR) part 125 certificate holders, use PTRS activity codes 3625 and 5625.

B. Safety Assurance System (SAS). For 14 CFR parts 121 and 135 certificate holders, use SAS automation and the associated Data Collection Tools (DCT).

3-2237 OBJECTIVE. This section provides guidance for the principal maintenance inspector (PMI) in assisting the principal operations inspector (POI) in evaluating for approval proposed deicing/anti-icing programs.

3-2238 GENERAL. The current regulations in parts 121, 125, and 135 are based on the "clean aircraft" concept. These regulations prohibit a takeoff with frost, ice, or snow (contamination) adhering to the wings, control surfaces, or propellers of an airplane. Part 121, § 121.629, part 125, § 125.221, and part 135, § 135.227 require that each part 121/135 operator that conducts operations under conditions that may produce frost, snow, or ice accumulation must have one or both of the following:

- An approved aircraft deicing program.
- An inspection program that ensures that aircraft are free of any accumulation of frost/ice/snow before takeoff.

A. Approval Process. The approval of an operator's deicing/anti-icing program involves the following steps:

1) Reviewing the Operator's Program Submission. Both the PMI and the POI initially review the proposed program to ensure that all required elements have been submitted. After the PMI and the POI are satisfied that all of the required elements are suitably addressed, they will distribute copies of the program to all involved aviation safety inspectors (ASI).

2) Evaluating the Operator's Program Submission. Conduct a detailed analysis of the proposed program, training, equipment, and facilities.

3) Validation Testing. Validate the operator's performance during actual operations.

B. Issuance of Operations Specifications (OpSpecs). At the conclusion of the process, the POI with primary responsibility for this job task will issue the OpSpecs. The OpSpecs

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authorize the operator to conduct operations under the program in ground icing conditions in which frost, ice, or snow may reasonably be expected to adhere to the operator's aircraft.

C. Provisions and Exceptions. Section 121.629(d) includes an exception to the requirements for a complete deicing/anti-icing program. This section provides that an air carrier is not required to have an approved deicing/anti-icing program if an Outside-the-Aircraft Check (OTAC) is completed within 5 minutes before beginning the takeoff. An OTAC must be performed from outside the aircraft to ensure that the "wings, control surfaces, and other critical surfaces are free of frost, ice, and snow" when the certificate holder is operating in ground icing conditions. If a certificate holder chooses to operate in accordance with § 121.629(d), the requirement for an OTAC must be contained in its OpSpecs.

D. Use of Infrared Deicing Facilities. An operator wishing to use an infrared deicing facility should ensure that the infrared deicing system used by that facility meets the criteria presented in this section or provides an alternative, acceptable means of assuring the operational safety of the deicing facility. Once an operator has determined that the infrared deicing system to be used by a deicing facility meets the criteria presented in this chapter, the operator should present their findings to their certificate-holding district office (CHDO) for review. Once the Federal Aviation Administration (FAA) determines, from the findings presented, that the infrared deicing system meets all criteria, then the system may become part of the operator's ground deicing/anti-icing program. Operators should use the following criteria for approving the use of infrared deicing systems:

1) The operator should create an appropriate description of the system: hardware, energy source, markings, etc. In addition, the operator should ensure that:

a) The infrared deicing system performs its intended purpose (i.e., it effectively deices an aircraft).

b) The operation of infrared deicing systems does not create a hazard to:

- Aircraft;
- Ground personnel, as determined by appropriate Occupational Safety and Health Administration (OSHA) standards;
- Crewmembers;
- Passengers;
- Cargo (sensitive materials, plants, animals, etc.); or
- Airport facilities (navigational aids, antennas, communication facilities, buildings, etc.).

c) The infrared system submitted for approval is in agreement with appropriate industry standards as created by groups such as: SAE International (SAE), the International Organization for Standardization (ISO), and FAA documents.

2) The method for approving the operational use of an infrared system should follow established guidelines set by industry groups, such as SAE, ISO, Airlines for America (A4A),

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the International Civil Aviation Organization (ICAO), and the General Aviation Manufacturers Association (GAMA). These guidelines should address:

- The training of flightcrew, infrared equipment ground operator personnel, facility maintenance personnel, and deicing/anti-icing ground personnel;
- The temperature of the aircraft surface, including thermal cyclic loading, thermal stresses, and temperature extremes;
- Melted ice flowing into aerodynamically quiet areas and refreezing;
- Additional deicing and anti-icing requirements; and
- Environmental considerations.

E. Alternative Methods of Deicing. Given the cost of deicing with conventional fluids and the recent demand for alternative deicing methods, interest in infrared deicing systems has increased. The FAA encourages the development and use of alternative methods of deicing such as infrared systems; however, it is necessary to ensure that infrared deicing systems are used with the highest degree of safety. Consequently, the FAA has developed general safety criteria for operators and inspectors to use in evaluating and approving the use of infrared deicing systems in an operator's deice/anti-ice program.

F. Infrared Deicing Facility Criteria. An operator wishing to use an infrared deicing facility should ensure that the infrared deicing system used by that facility meets the criteria, or provides an alternative, acceptable means of ensuring the operational safety of the deicing facility.

3-2239 DEFINITIONS.

A. Pretakeoff Check. A pretakeoff check is a check of the aircraft's wings or representative aircraft surfaces for frost, ice, or snow during the aircraft's holdover time (HOT).

B. Pretakeoff Contamination Check. A pretakeoff contamination check is conducted by the flightcrew and ground personnel after exceeding the HOT. They conduct this check to make sure that the wings, control surfaces, and other critical surfaces, as defined in the operator's program, are free of frost, ice, and snow. The pretakeoff contamination check must be completed within 5 minutes before beginning the takeoff.

C. Outside-the-Aircraft Check (OTAC). Section 121.629(d) requires an OTAC of a certificate holder who operates in ground icing conditions without an approved part 121 ground deicing/anti-icing program. For those operators without an approved program, if frost, ice, or snow may reasonably be expected to adhere to the aircraft, an OTAC must be performed to ensure that the wings, control surfaces, and other critical surfaces are free of contamination. An OTAC must occur within 5 minutes before beginning the takeoff.

D. Holdover Time (HOT). HOT is the estimated time for which deicing/anti-icing fluid will prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aircraft. HOT begins when the final application of deicing/anti-icing fluid starts and ends when the applied deicing/anti-icing fluid loses its effectiveness.

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3-2240 PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites:

- Knowledge of the regulatory requirements of part 121, 125, or 135, as applicable; and
- Successful completion of appropriate Airworthiness Indoctrination course(s).

B. Coordination. This task requires coordination with POIs and the operator.

3-2241 REFERENCES, FORMS, DATA COLLECTION TOOLS (DCT), AND JOB AIDS.

A. References (current editions):

- Advisory Circular (AC) 00-45, Aviation Weather Services.
- AC 20-73, Aircraft Ice Protection.
- AC 20-117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing.
- AC 23.1419-2, Certification of Part 23 Airplanes for Flight in Icing Conditions.
- AC 65-15, Airframe and Powerplant Mechanics Airframe Handbook (refer to Chapter 7, Ice and Rain Protection).
- AC 91-74, Pilot Guide: Flight in Icing Conditions.
- AC 91-79, Mitigating the Risks of a Runway Overrun Upon Landing.
- AC 120-42, Extended Operations (ETOPS and Polar Operations).
- AC 120-58, Pilot Guide for Large Aircraft Ground Deicing.
- AC 120-60, Ground Deicing and Anti-Icing Program.
- AC 120-89, Ground Deicing Using Infrared Energy.
- AC 135-9, FAR Part 135 Icing Limitations.
- AC 135-16, Ground Deicing and Anti-Icing Training and Checking.
- AC 135-17, Pilot Guide–Small Aircraft Ground Deicing.
- AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.
- Volume 3, Chapter 27, Ground Deicing/Anti-Icing Programs.
- Volume 4, Chapter 3, Section 5, Safety Assurance System: Selected Practices.
- FAA P-8740-24, Winter Flying Tips.
- Publications of the Association of European Airlines (AEA) found on the website: http://www.aea.be/news-media-room-media-centre/publications.html.

NOTE: Numerous videos have been produced by manufacturers of deicing/anti-icing products and by aircraft operators. Access to these videos may be available through the regional deicing/anti-icing coordinator.

B. Forms. None.

C. Job Aids. Job Task Analyses (JTA) 2.3.34 and 3.3.57.

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3-2242 PROCEDURES.

A. Brief the Operator.

1) Assist the operator in acquiring all of the pertinent published information.

2) Ensure that the operator is familiar with the technical difficulties that may be involved and the regulatory requirements that must be met.

3) Outline for the operator those elements that must be contained in the operator's proposed program and the required actions at each stage of the approval process.

4) POIs and PMIs should inform the operators for which they have oversight responsibility of the process and criteria for approving infrared deicing systems. The operators should be informed that it is their responsibility to evaluate any infrared deicing system that they wish to use for their aircraft ground deicing/anti-icing program.

B. Review the Operator's Submittal.

1) If the submission is incomplete, immediately inform the operator and determine if the operator intends to complete the package.

2) If the submission is complete, inform the operator and distribute the documents to the appropriate inspectors for initial examination.

3) If the package is unacceptable, discuss with the operator those elements that were unacceptable and/or return the package with a letter outlining the deficiencies.

4) Once an operator has determined that an infrared deicing system meets the criteria, that operator should present its findings of the evaluation to its principal inspector (PI).

C. Evaluate the Operator's Deicing/Anti-Icing Program.

1) Ensure that the manual provides all categories of employees with instructions and information that helps them to perform their duties with a high degree of safety.

2) Ensure that the operator's manual material includes the following:

- Clear identification of each category of employee with responsibility for deicing/anti-icing program elements;
- Duty definition of each category of employee involved;
- Background information and step-by-step procedures; and
- Checklists, where appropriate, that will allow each category of employee to perform their responsibilities to the required standard.

3) To ensure that the program complies with § 121.629(c), each operator's ground deicing/anti-icing program must cover a management plan detailing operational responsibilities and procedures as described in AC 120-60.

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D. Review Management Plan. The operator should develop, implement, and use a management plan to ensure proper execution of its approved deicing/anti-icing program. The management plan should include operations and maintenance responsibilities and identify the management positions that are responsible for ensuring that all necessary elements of the deicing/anti-icing program are properly executed.

E. Examine Holdover Timetables and the Procedures for Their Use. Ensure that each operator has developed, and has available, holdover timetables for use by its personnel. In addition, each operator must make its holdover timetables available for use in the cockpit. These timetables are required to be supported by data acceptable to the Administrator.

F. Evaluate the Operator's Training. Ensure that the operator has developed a training program that qualifies each category of employee with responsibilities for deicing/anti-icing. Flightcrew training must be incorporated into the operator's approved training program. The training program must include the following:

1) General procedures and any specific requirements for each make, model, and variant of aircraft used by the operator.

2) Means of testing, qualification, and requalification for each category of employee involved in the program.

3) Demonstration of proficiency, by performance, of flightcrew members, equipment operators, and inspectors.

4) Procedures for recurrent training.

G. Determine if Exceptions Apply to the Operator.

1) Certificate Holders That Do Not Operate in Ground Icing Conditions. The part 135 ground deicing rule does not apply to a certificate holder that does not operate in ground icing conditions. This certificate holder is not required to train its pilots or develop pretakeoff contamination check procedures. Certificate holders that do not operate in ground icing conditions will have that limitation in their OpSpec A042.

2) Operators Using Only One Pilot in Operations. Single-pilot operators are not required to comply with the manual and approved training requirements of § 135.21 or § 135.341. Therefore, single-pilot operators are not required to have an approved pilot training program or the additional training required by the part 135 ground deicing rule. However, single-pilot operators must comply with all of the operational requirements of the part 135 ground deicing rule. Those operational requirements include a pretakeoff contamination check or an approved alternative procedure to the pretakeoff contamination check described in its OpSpec. The pilots of these types of operators will need to demonstrate sufficient knowledge to operate in ground icing conditions during the initial and recurrent flight checks. A single-pilot operator will have an aircraft-specific description of the pretakeoff contamination check in its OpSpecs A041.

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3) Helicopter Operations. Helicopter operations conducted under part 135 are excluded from the additional training and pretakeoff contamination check requirements of the part 135 ground deicing rule. However, the regulation requires the "clean aircraft" concept for helicopters.

H. Determine if Operator's Program Meets Training Requirements of Part 135 Ground Deicing Rule. For operators required to have an approved training program, the training program must include pilot ground training in those subject areas relating to deicing and anti-icing operations required by § 135.345 for initial, transition, and upgrade training and by § 135.351 for recurrent training and testing. These training requirements must include procedures for operating airplanes during ground icing conditions. The operator must provide that training to its pilots and all other participating personnel. The training must include at least the following elements:

1) Use of HOTs. In part 135 operations, HOTs are only advisory and serve as guidance to the pilot in making takeoff decisions. If the operator uses the deicing/anti-icing fluids, it must train its pilots in the use of HOTs.

2) Deicing/Anti-Icing Procedures. Airplane deicing/anti-icing procedures include inspections and check procedures, and responsibilities and requirements for the pretakeoff contamination check or alternative procedures, as applicable.

3) Communications. The operator must provide training for all company personnel in communicating with all agencies involved in the deicing/anti-icing process and the decisionmaking process.

4) Contamination. Aircraft surface contamination training includes how to identify frost, ice, or snow, and how to locate critical areas. Training should include an explanation of how small amounts of surface contamination adversely affect aircraft performance and flight characteristics.

5) Deicing/Anti-Icing Fluids. If the operator uses deicing/anti-icing fluids, it must train its pilots, as well as any other participating personnel, in the types and characteristics of deicing/anti-icing fluids.

NOTE: It is important that flightcrews do not use deicing/anti-icing fluids unless they have been trained in the characteristics and effects of these fluids on their operation.

6) Cold Weather Preflight Inspection Procedures. Training should include procedures for cold weather preflight inspections.

7) Contamination Recognition. This aspect of training should cover techniques for recognizing contamination on the aircraft. These techniques should be used during both the preflight inspection and the pretakeoff contamination check.

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NOTE: Both part 121 and 135 operators must have documentation in their general manuals (GM) or flight manuals (fm) for the procedures they intend to use to comply with their respective deicing/anti-icing rule.

3-2243 TASK OUTCOMES.

A. Complete the PTRS Record. For part 125.

B. Follow SAS Guidance Module 5. For parts 121 and 135.

C. Complete the Task. Completion of this task will result in one of the following:

- For program approval, the result is issuance of OpSpecs.
- For program disapproval, the result is listing of the restriction in OpSpec A004.

D. Document the Task. For part 125, file all of the supporting paperwork in the operator's office file. For parts 121 and 135, follow the SAS process.

3-2244 FUTURE ACTIVITIES. Normal surveillance.

RESERVED. Paragraphs 3-2245 through 3-2248.

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CHAPTER 54 PART 142 TRAINING CENTERS

Section 5 Safety Assurance System: Part 142 Training Centers: Outsource Training—Air Operators and/or Fractional Ownership Program Managers Contracting With Training Providers

Source Basis:

- **Section 91.1027, Recordkeeping.**
- **Section 91.1073, Training Program: General.**
- **Section 91.1075, Training Program: Special Rules.**
- **Section 91.1079, Training Program: Curriculum.**
- **Section 91.1081, Crewmember Training Requirements.**
- **Section 91.1083, Crewmember Emergency Training.**
- **Section 91.1087, Approval of Aircraft Simulators and Other Training Devices.**
- **Section 91.1089, Qualifications: Check Pilots (Aircraft) and Check Pilots (Simulator).**
- **Section 91.1091 Qualifications: Flight Instructors (Aircraft) and Flight Instructors (Simulator).**
- **Section 91.1093, Initial and Transition Training and Checking: Check Pilots (Aircraft), Check Pilots (Simulator).**
- **Section 91.1095, Initial and Transition Training and Checking: Flight Instructors (Aircraft), Flight Instructors (Simulator).**
- **Section 91.1097, Pilot and Flight Attendant Crewmember Training Programs.**
- **Section 91.1099, Crewmember Initial and Recurrent Training Requirements.**
- **Section 91.1101, Pilots: Initial, Transition, and Upgrade Ground Training.**
- **Section 91.1103, Pilots: Initial, Transition, Upgrade, Requalification, and Differences Flight Training.**
- **Section 91.1105, Flight Attendants: Initial and Transition Ground Training.**
- **Section 91.1107, Recurrent Training.**
- **Section 121.401, Training Program: General.**
- **Section 121.402, Training Program: Special Rules.**
- **Section 121.403, Training Program: Curriculum.**
- **Section 121.407, Training Program: Approval of Airplane Simulators and Other Training Devices.**
- **Section 121.411, Qualifications: Check Airmen (Airplane) and Check Airmen (Simulator).**
- **Section 121.412, Qualifications: Flight Instructors (Airplane) and Flight Instructors (Simulator).**
- **Section 121.413, Initial, Transition, and Recurrent Training and Checking Requirements: Check Airmen (Airplane), Check Airmen (Simulator).**
- **Section 121.414, Initial, Transition, and Recurrent Training and Checking Requirements: Flight Instructors (Airplane), Flight Instructors (Simulator).**
- **Section 121.415, Crewmember and Dispatcher Training Program Requirements.**

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- **Section 121.417, Crewmember Emergency Training.**
- **Section 121.418, Differences Training and Related Aircraft Differences Training.**
- **Section 121.419, Pilots and Flight Engineers: Initial, Transition, and Upgrade Ground Training.**
- **Section 121.421, Flight Attendants: Initial and Transition Ground Training.**
- **Section 121.422, Aircraft Dispatchers: Initial and Transition Ground Training.**
- **Section 121.423, Pilot: Extended Envelope Training.**
- **Section 121.424, Pilots: Initial, Transition, and Upgrade Flight Training.**
- **Section 121.425, Flight Engineers: Initial and Transition Flight Training.**
- **Section 121.427, Recurrent Training.**
- **Section 121.683, Crewmember and Dispatcher Record.**
- **Section 125.401, Crewmember Record.**
- **Section 125.296, Training, Testing, and Checking Conducted by Training Centers: Special Rules.**
- **Section 125.297, Approval of Flight Simulators and Flight Training Devices.**
- **Section 135.63, Recordkeeping Requirements.**
- **Section 135.323, Training Program: General.**
- **Section 135.324, Training Program: Special Rules.**
- **Section 135.327, Training Program: Curriculum.**
- **Section 135.329, Crewmember Training Requirements.**
- **Section 135.330, Crew Resource Management Training.**
- **Section 135.331, Crewmember Emergency Training.**
- **Section 135.335, Approval of Aircraft Simulators and Other Training Devices.**
- **Section 135.337, Qualifications: Check Airmen (Aircraft) and Check Airmen (Simulator).**
- **Section 135.338, Qualifications: Flight Instructors (Aircraft) and Flight Instructors (Simulator).**
- **Section 135.339, Initial and Transition Training and Checking: Check Airmen (Aircraft), Check Airmen (Simulator).**
- **Section 135.340, Initial and Transition Training and Checking: Flight Instructors (Aircraft), Flight Instructors (Simulator).**
- **Section 135.341, Pilot and Flight Attendant Crewmember Training Programs.**
- **Section 135.343, Crewmember Initial and Recurrent Training Requirements.**
- **Section 135.345, Pilots: Initial, Transition, and Upgrade Ground Training.**
- **Section 135.347, Pilots: Initial, Transition, Upgrade, and Differences Flight Training.**
- **Section 135.349, Flight Attendants: Initial and Transition Ground Training.**
- **Section 135.351, Recurrent Training.**
- **Section 142.1, Applicability.**
- **Section 142.3, Definitions.**
- **Section 142.39, Training Program Curriculum Requirements.**
- **Section 142.47, Training Center Instructor Eligibility Requirements.**
- **Section 142.49, Training Center Instructor and Evaluator Privileges and Limitations.**

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- **Section 142.53, Training Center Instructor Training and Testing Requirements.**
- **Section 142.55, Training Center Evaluator Requirements.**
- **Section 142.59, Flight Simulators and Flight Training Devices.**
- **Section 142.73, Recordkeeping Requirements.**
- **Section 142.81, Conduct of Other Approved Courses.**

3-4409 GENERAL. This section provides policy guidance for principal operations inspectors (POI) that have operators or receive requests from their operators to outsource a portion of their required crewmember training. The information in this section may also be useful for Training Center Program Managers (TCPM), operators, and training center managers (TCM). This section is related to Safety Assurance System (SAS) Element 2.1.4, Outsource Crewmember Training.

3-4410 BACKGROUND.

A. References. In addition to adopting Title 14 of the Code of Federal Regulations (14 CFR) part 142, the Federal Aviation Administration (FAA) also revised applicable sections of 14 CFR parts 61, 63, 91 subpart K (part 91K), 121, 125, 135, and 141 to provide a means for crediting the training, testing, and checking accomplished in flight simulation training devices (FSTD) toward the flight training requirements of those parts. The adoption of part 142 enabled operators to pursue training alternatives not previously available under the regulations. Part 142 has made the use of training centers by operators more widely accepted as an alternative means of providing training to its employees.

NOTE: "Alternative means" as used in part 142 has in some cases been misunderstood and has been interpreted to mean that compliance with a training center's approved courses will meet the training requirements required by the appropriate operating rules for an operator. This is not the case. "Alternative means" permits an operator to outsource or arrange to have its approved training conducted by a third party. It does not mean that an operator has an "alternative means" to meet the training approval requirements governing its particular operation. Programs approved in accordance with part 142 may not be used as an alternative means of satisfying the requirements of the appropriate operating rules as approved by the operator's POI.

B. TCPMs and POIs. As the use of training centers continues to increase, the interrelationship between a center's TCPM and an operator's POI have become increasingly important. When an operator wishes to use the services of a part 142 training center, the most common operational issues that POIs must resolve—and this section will address—are outlined below:

1) Exactly what portion of the operator's required crewmember training, checking, and/or testing will the center be authorized to conduct?

2) What qualification requirements are necessary to enable training center flight instructors to conduct the requested training? (Refer to part 91, §§ 91.1091 and 91.1095; part 121, §§ 121.412 and 121.414; and part 135, §§ 135.338 and 135.340.)

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3) How does the operator propose to qualify Training Center Evaluators (TCE) or other personnel to become contract check airmen? (Refer to §§ 91.1089, 91.1093, 121.411, 121.413, 135.337, and 135.339.)

4) What documentation is required to ensure the training conducted by the center complies with the operator's approved curriculums, and how does the operator propose to document this training?

3-4411 BASIC STRUCTURE.

A. Operating Rules. The operating rules of parts 121, 125, 135, and 91K permit operators to use the services of another operator certificated under the same part or a certificated part 142 training center to conduct some or all of their required crewmember training. If approved by the operator's POI, an operator may use the training provider's facilities, equipment, and personnel to varying degrees to accomplish the training, checking, and testing required by their approved training program.

B. Training Curriculum. Regardless of who actually developed an operator's training curriculum, the operator is responsible for its approval, oversight, content, and currency. Regulations are very clear regarding an operator's requirement to have appropriate crewmember training programs that support their particular operation. The regulations are also clear concerning the requirement to have these programs approved by the Administrator. In the case of the operator, this approval is delegated to the operator's POI. In similar fashion, training centers certificated under part 142 are also required to have their curriculums approved by the Administrator. For training centers, the approval authority is delegated to the center's TCPM.

C. Arrangements. The following cases are the two most common arrangements that are formed between air carriers and training centers.

1) Case One—Dry Lease.

a) The least complicated way in which an operator may use the facilities and equipment of a training center is through a "dry lease" agreement. In this case, the operator has developed and maintains its own approved training curriculum, associated courseware, materials, checklists, procedures, and personnel to conduct training and checking, but elects to dry lease flight training equipment and facilities from a training center. Associated airman certification functions and proficiency requirements are completed by check airmen employed by the carrier (not the training center), the operator's aircrew program designee (APD), or the FAA. The operator accomplishes recordkeeping, although required training records may be maintained at the training facility if approved by their POI. POIs will make all enhanced Vital Information Database (eVID) entries concerning the operator's check airman activities. The operator's POI approves the use of the center's flight training equipment; however, the operator is responsible for ensuring that the center's equipment and facilities continue to meet the standards required to accomplish required training. The training center simply acts as a host for the operator and center personnel are not involved in the training or checking of the operator's crewmembers.

b) POIs are responsible for providing required surveillance to determine if contracted facilities and training equipment meet the requirements for continued approval.

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Due to the center's physical location in relation to the POI's office, the POI may request the center's TCPM to provide information concerning the training center facility and equipment, as well as assistance in performing required surveillance.

c) Operators who conduct training in this manner (dry lease) are not outsourcing their training from another training provider and therefore do not require approval for outsourced training in their Operations Specification (OpSpec)/Management Specification (MSpec)/Letter of Authorization (LOA) A031, Outsourced Training.

2) Case Two—The Training Center Provides Facilities, Instructors, and/or Evaluators Under Contract to the Operator.

a) The second most common way operators use the services of part 142 training centers is to enter into an agreement with the center to provide instructors and/or evaluators to act on behalf of the operator in the conduct of the operator's training curriculum. In this situation, the operator may have developed their own training curriculum, hired a consultant to develop the curriculum, or adopted the training center's curriculum. Regardless of the source, each curriculum must be approved by the operator's POI for their use. However, it is not uncommon for operators to adopt one of the center's core or specialty curriculums and submit it without revision, to their POI for approval. Prior to submitting a center-developed curriculum to their POI for approval, the operator must conduct a detailed review and comparison and analysis of the center's curriculum, courseware, procedures, equipment, and personnel to determine if the training center's curriculum will meet their operational needs. If the operator determines that the center's curriculum will meet their needs, they may submit it to their POI for approval. If the POI accepts the submitted curriculum and grants approval, the curriculum becomes part of the operator's approved program, and in effect becomes the operator's curriculum. This trend is particularly evident among part 135 and new entrant part 121 operators for whom the development of a complete in-house pilot qualification program using modern FSTDs often entails prohibitive costs and logistics.

b) Training center personnel (flight instructors) conducting flight training activities for an operator must be trained and qualified in accordance with the air carrier's approved program to become eligible to conduct training under the air carrier's approved curriculum (§§ 121.412 and 121.414; §§ 135.338 and 135.340; or §§ 91.1091 and 91.1095, as appropriate). If an air carrier wishes to have the center provide flight checking or testing services, the air carrier must ensure nominated individuals are trained and qualified as a check airman in accordance with their approved training program (§§ 121.411 and 121.413; §§ 135.337 and 135.339; or §§ 91.1089 and 91.1093, as appropriate).

c) The center may maintain the operator's training records if approved by the POI. However, the responsibility for the adequacy of the records remains with the operator, not the training center.

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d) If the operator elects to nominate one or more of the center's personnel to act as a contract check airman, and the operator's POI authorizes such check airmen, the POI must maintain all check airman entries in the eVID. In other words, whether an operator uses their own personnel as check airmen (as outlined in Case One) or elects to use center employees as contract check airmen, all required eVID entries relating to check airmen will be made by the POI. This will help ensure that both the POI and the operator maintain proper operational control over persons performing check airmen/contract check airmen functions.

e) The POI must be assured that the center's facilities and equipment are adequate to conduct the training the operator is proposing. The center's TCPM is one of the POI's best sources of information to enable him/her to make the determination that the center's facilities and training equipment are adequate for the proposed operation and to assist with required surveillance activities.

f) Operators who wish to engage a training center to accomplish the aircraft-specific training modules of their curriculum create special surveillance requirements. The division of an operator's required training between the operator and a training center creates a unique recordkeeping situation, as well as specialized training for the center instructors. POIs must be extremely vigilant in determining who is accomplishing each element of the operator's program and that the complete program is accomplished. POIs should communicate regularly with the training center's TCPM and are encouraged to request assistance with surveillance of the operator's activities at the training center. The TCPM's assistance will typically afford the POI greater flexibility and a higher level of surveillance than would normally be possible without the TCPM's assistance. An operator should develop and keep up to date a "Training Source Document" or similar statement detailing what training will be provided in house and what will be conducted by the training center. See the FAA's Air Transportation Division (AFS-200), Air Carrier Training Systems and Voluntary Safety Programs Branch (AFS-280) website for a sample of such a document.

3-4412 PART 142 APPROVED CURRICULUMS. A short review of the various types of training center curriculums and their approval process will assist with our understanding of the appropriateness of these curriculums for use by an operator. It is important to emphasize that a center's approved curriculum may not be used by an operator without first being evaluated for appropriateness and secondly, being approved for use by the operator's POI.

A. Core Curriculum.

1) A core curriculum is a training center-developed course that is approved by the Administrator (through the TCPM) for the purpose of meeting the training and certification requirements of airmen under parts 61 and/or 63. (Refer to part 142, § 142.3.)

2) In order for a training course to be approved as a core curriculum it must:

a) Meet the applicable requirements of part 142 subpart B and part 61 or 63;

b) Contain all the events and maneuvers required by the appropriate practical test standards (PTS) or Airmen Certification Standards (ACS) for the issuance of the particular Airman Certificate for which the curriculum was designed;

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c) Meet the requirements of the Flight Standardization Board (FSB) report for that specific aircraft;

d) Consist of training segments that identify training and testing requirements for the issuance of a particular certificate;

e) Follow the guidance in Volume 3, Chapter 54, Section 6, Part 142 Training Centers: Evaluate Training Programs, Curriculums, Flight Training Equipment, and Recordkeeping Requirements and Volume 3, Chapter 19, Section 5, Safety Assurance System: Flightcrew Aircraft Ground Training Curriculum Segments concerning ground and flight training threshold hours; and

f) Include maneuver descriptions, standard operating procedures (SOP), checklists, and other supporting courseware.

3) Part 142 pilot training curriculums are designed to meet the certification requirements of part 61 and therefore do not include many of the operator-specific elements required by the operating rules associated with an air carrier/operator. For example, a part 142 core curriculum does not require a training center to specify the training that is normally found in an operator's OpSpecs, such as authorized takeoff or landing minimums, types of authorized approaches, and captain high minimum requirements. Additionally, ground training in areas such as hazardous materials (hazmat) handling, security, aircraft maintenance, logbook procedures, and flight following is also not required to be part of a part 142 training center's core curriculum. Although a training center's part 142 approved core curriculum may meet the aircraft-specific requirements for an operator, these curriculums do not qualify operator's pilots for line operations and may not be used by an operator without the specific approval of the operator's POI.

B. Specialty Curriculums. This term refers to courses that are designed to satisfy a particular requirement of 14 CFR chapter I (parts 1–199), other than airman certification under parts 61 and 63. The Administrator (through the TCPM) is authorized to approve specialty curriculums for use by a training center and, if appropriate, associated satellite and/or remote sites (refer to § 142.3). Training centers often develop specialty curriculums to meet the specific needs of a particular customer. Some examples of specialty curriculums include (but are not limited to) Category II/III authorization, equipment differences training, night vision goggles (NVG) and so forth. Specialty curriculums can vary widely in focus and subject matter and may be developed for personnel other than flightcrew members (refer to § 142.81). The approval of specialty curriculums or courses by a training center's TCPM, however, does not enable those curriculums or courses to be used by an operator without the specific approval of the operator's POI.

3-4413 ROLES, RESPONSIBILITIES, AND COORDINATION. The safety, efficiency, and quality of training provided by training centers, through the use of structured programs and FSTDs, has proven to be an effective and economical means for some operators to accomplish required training. Consequently, a number of operators have come to rely on part 142 training centers as a source of technical expertise and as their primary training provider. As the use of approved training centers continues to expand, it becomes increasingly important to understand

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the roles, responsibilities, and coordination activities required of each participant. Subparagraphs A through D of this paragraph that emphasize the regulatory roles and responsibilities, as well as the coordination required between operators and training centers when an operator is using a training center to conduct a portion of their required training program. Subparagraphs A through D of this paragraph do not focus on day-to-day activities associated with the surveillance of training centers or operators outside of the context and scope of this section. It is presumed that these activities are being conducted in accordance with the guidance located elsewhere in this chapter, associated regulations, orders, and policy guidance.

A. Air Operators. The regulatory responsibility for ensuring that an operator's training program remains current and continues to meet the operator's needs resides with the operator, not the training provider. When an operator makes application to use the services of an authorized training provider they must:

1) Ensure that all training, testing, and/or checking to be conducted by the training center has been approved by the POI before any training is accomplished.

2) Develop an instructor/check airman standardization program including a checklist, which clearly identifies those elements of the operator's program that are to be completed by the training center and those that are to be completed by the operator. This checklist must specifically identify each training element that will be conducted by the center and include the regulatory and/or the training program reference for each item.

NOTE: A sample air operator standardization review may be found on the AFS-280 website. The sample program is designed to be all-inclusive and therefore not every item covered in the sample may be applicable to all operators. The sample is intended to be comprehensive and include sufficient detail to ensure the training provider has an accurate understanding of the operator's training requirements. The FAA suggests that each subject in the sample standardization program be reviewed with a potential training provider to ensure a complete understanding of each party's role.

3) Develop an implementation plan to perform oversight of center facilities and personnel engaged in the conduct of the operator's training and associated evaluations. The operator's implementation plan must:

a) Ensure that all training center personnel selected to act as contract instructors (both ground and flight) and/or contract check airmen are appropriately trained and qualified. Flight instructors and/or check airmen must be qualified in accordance with the operator's approved program. (Refer to §§ 91.1089 through 91.1095; §§ 121.411 through 121.414; and §§ 135.337 through 135.340, as appropriate.)

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NOTE: Operators must complete a detailed comparison between their check airman curriculum and that of the training center's TCE curriculum to determine what, if any, additional training must be provided to qualify the center's personnel to act as a contract check airman. Elements of the center's instructor/TCE training curriculum that the operator finds equivalent to their training program may, with the POI's approval, be credited toward the completion of the operator's instructor/check airman curriculum. If the center's curriculum is approved as meeting the requirements of the operator's curriculum, other than the operator-specific items, no additional training for the center's personnel would be required. Any differences or deficiencies noted will require the operator to develop a training module to ensure all regulatory requirements are met and to qualify the center's personnel as contract check airman. This module that includes the operator-specific subjects must be presented to the operator's POI for approval/acceptance.

b) Provide the center with appropriate administration procedures and instructions to be used in the accomplishment of agreed training.

c) Provide for the oversight of all contract center personnel who are authorized to conduct training, testing, and/or checking on behalf of the operator.

4) Additionally, the following procedures must be followed when requesting the use of center personnel to become qualified as contract check airmen:

NOTE: These procedures follow the guidance outlined in Volume 3, Chapter 20, and should be accomplished in the order shown.

a) Evaluate the instructor/TCE's credentials to ensure he or she meets company requirements to become a contract check airman;

b) Evaluate the individual's training record to determine the differences training required to qualify the individual as a contract check airman;

c) Develop an appropriate training differences module(s) to qualify the center's instructor/TCE as a contract check airman and submit the training module to the POI for acceptance/approval; and

d) Conduct and record appropriate check airman training; submit the individual's name, short résumé, and training records to the POI for review and approval in accordance with Volume 3, Chapter 20.

NOTE: POIs should notify the center's TCPM whenever they authorize one of the center's personnel to act as a contract check airman by forwarding the TCPM a copy of the contract check airman's LOA.

5) Coordinate the approval of FSTD missing, malfunctioning, or inoperative (MMI) equipment procedures that will be used in support of the operator's curriculum.

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B. POIs.

1) When an operator requests the use of a training center's facilities, FSTDs, curriculums (core and/or specialty), flight instructors, TCEs, and/or other services, including recordkeeping, the POI is responsible for determining the operator's request conforms to the appropriate regulations, policies, and procedures.

2) The approval authority for an operator to conduct training at a training center resides with the operator's POI, and must conform to the training program approval process outlined in Volume 3, Chapter 19. If an operator wishes to use a training center's core and/or specialty curriculums to meet a portion of their required training program, it is the operator's responsibility to ensure:

a) The center's curriculums/courses meet the operator's training requirements.

b) The curriculums are submitted to the operator's POI for review and approval in accordance with the procedures outlined in Volume 3, Chapter 1, Section 1.

c) The curriculums are integrated into the operator's training program.

NOTE: If the curriculums are approved for the operator's use, these curriculums now become a portion of the operator's approved training program, and the maintenance/currency of those curriculums becomes the responsibility of the operator, not the training center.

3) If an operator applies to have the same training curriculum conducted by two or more centers (either operated by the same or a different training provider/company), the operator must develop an implementation plan for each center and ensure that each of the approved centers conducts their training curriculum using the operator's approved training curriculum (including maneuvers, procedures, and checklists). Additionally, each center must be specifically approved for use by the POI and listed in the operator's OpSpec/MSpec/LOA A031. It is the responsibility of the operator to ensure that all required software and hardware approved to support the subject curriculum is available and used by each center during the delivery of their training curriculum. See subparagraph 3-4414D below for additional guidance.

NOTE: POIs should notify the center's TCPM whenever they authorize one of the center's personnel to act as a contract check airman. This may be accomplished by forwarding the TCPM a copy of the contract check airman's LOA. POIs are encouraged to contact the center's TCPM for assistance with the review and potential approval of a contract check airman. TCPMs are often the POI's best source of information relating to a center's operation and personnel. A sample contract check airman LOA is located on the AFS-280 website.

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4) When an operator requests approval of a training provider's personnel, to act as contract instructor and/or contract check airman to conduct a portion of their required training, it is the operator's responsibility to ensure those individuals are qualified to conduct the subject training. Prior to authorizing a center's flight instructors or TCE(s) to conduct any portion of an operator's training, the operator must qualify each individual in accordance with the training and testing requirements of their operating rule and provide sufficient evidence of such training and checking to the POI for review and approval.

5) Sections 121.414(a)(2), 135.340(a)(2), and 91.1095(a)(2) require an observation of each authorized flight instructor to be accomplished at least once every 24 months. Additionally, §§ 121.413(a)(2), 135.339(a)(2), and 91.1093(a)(2) require an observation of each simulator and aircraft check airman to be accomplished at least once every 24 months.

NOTE: Part 142 has similar requirements for flight instructors and evaluators. However, part 142 requires these observations to be conducted at least once every 12 months. (Refer to §§ 142.53(a)(1) and 142.55(a)(2).)

a) The intent of these regulations is to ensure the continued standardization and quality of each operator's training program by performing periodic observations of each flight instructor and check airman by focusing on the individual's performance in conducting a representative part of a curriculum or training program approved for that operator.

b) A qualified inspector or APD may be requested to observe contract flight instructors and contract check airmen on behalf of the POI. Whether conducting its own training or contracting for training with a training provider, each operator must ensure that all required observations are accomplished and documented. A training center's part 142 observations of their flight instructors may meet the requirements for the center under part 142, but not meet the requirements for an air carrier under part 121 or part 135. Such an observation might be acceptable for a portion of an operator's requirements under the following conditions:

1. When the training curriculum or curriculum segment conducted by the training center is essentially the same as that of the operator.

NOTE: Training program components may be viewed as "essentially the same" when they comprise identical checklists, operational procedures, and callouts, and flight deck layouts and flight manuals (fm) which are compatible in the judgment of the operator's POI. Training program components, which relate to like-aircraft types, are dissimilar when they do not meet the criterion for "essentially the same." When differences are too pronounced or too numerous in the judgment of the POI, flight deck layouts and fm must not be viewed as compatible.

2. When the observation is acceptable to the operator's POI.

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c) An observation conducted by the FAA is always permissible instead of an observation conducted by an approved check airman or by a Designated Examiner (DE) employed by the operator. An observation by an FAA inspector counts toward the observation requirements of all operators contracting for training program services provided by a training center. POIs and TCPMs may conduct an observation at any time at their discretion. It is anticipated that operators and training centers will exchange information regarding observations of their instructors. However, it is the responsibility of the operator to ensure that all required observations are kept current and are documented.

6) Conduct training center surveillance to determine continued compliance with the operator's approved program.

7) If the operator requests approval of two or more centers, determine that all training, testing, and checking is conducted using the operator's approved curriculum. To ensure standardized training for all of the operator's crewmembers, it is essential that, before authorizing multiple sources of training, the operator provides the POI with a surveillance plan to ensure continued compliance with their approved curriculum by all centers. Each authorized training center must conduct the operator's curriculum as approved by the operator's POI and be alike in content, training times, maneuver descriptions, procedures, checklists, and FSTDs. If a training center is providing the same training program to two or more operators at the same center, it may be permissible (with the operator's permission) to interchange crewmembers during the flight training phase. This may only be accomplished providing the individual operator's training curriculums are essentially similar, including aircraft checklist, flows, emergency procedures, and profiles. In this example, two separate but identical programs are being accomplished simultaneously.

8) Determine that FSTDs are appropriate to, and representative of, the aircraft being operated by the air carrier. Flight training equipment must be specifically qualified and approved for the operator's use, as well as each maneuver, procedure, or crewmember function to be trained.

9) Each training facility must be authorized and listed in the operator's OpSpec/MSpec/LOA A031.

10) Each training curriculum/module approved to be conducted by a training provider must be listed, by curriculum title, in the operator's OpSpec/MSpec/LOA A031.

11) Review the operator's instructor/check airman standardization program.

NOTE: A sample instructor/check airman standardization program can be found on the AFS-280 website.

12) Review the operator's training center audit program.

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13) Ensure that required airman training records meet regulatory requirements. If requested by the operator, the POI may permit the training provider to maintain the operator's crewmember training records. However, the operator must be advised that they (the operator) remain responsible for the security, accuracy, and availability of all required records. Permitting a training center to maintain operators' records does not relieve the POI of required check airman/APD tracking requirements outlined elsewhere in this order or the POI's office Quality Management System (QMS) policies.

C. TCPMs. From time to time, TCPMs may be called upon to assist a POI whose operator is using the services of a training center. The TCPM's firsthand knowledge of center personnel, facilities, equipment, and curriculums is a valuable resource that POIs have come to rely on. This knowledge enables TCPMs to:

1) Provide the POI information regarding the status and approval level of FSTDs and the installed equipment used by center instructors and TCEs;

2) Assist the POI by providing technical information regarding the center's curriculums, FSTDs, and facilities; and

NOTE: TCPMs should advise the POI of any status change involving an instructor or TCE that is also approved as a contract check airman for an operator.

3) Assist the POI with the evaluation of TCEs or other training center personnel nominated by the operator to become contract check airmen or flight instructors. The procedures outlined in Volume 3, Chapter 20, will be followed when evaluating center personnel as potential contract check airman candidates. Aviation safety inspectors (ASI) (e.g., TCPMs) must use the following Program Tracking and Reporting Subsystem (PTRS) codes to document surveillance of contract check airmen:

- Check Pilot Observation—Proficiency Check Oral or § 135.293(a) Knowledge Test (or any portion thereof): 1641.
- Check Pilot Observation—Proficiency or Competency Check (Simulator): 1642.
- Check Pilot Observation—Proficiency or Competency Check § 135.293(b) or § 135.297 (Aircraft): 1643.

NOTE: If the TCPM is observing a TCE, then a PTRS activity using code 1673 (for a TCE observation) should also be completed whether a check pilot observation is being completed or not.

4) Assist the POI with required surveillance activities including:

a) Potential contract check airmen;

b) Observing contract check airman during the evaluation of the operator's airman to ensure evaluations are objective, accurate, and consistent with the operator's program;

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c) Evaluation of required crewmember training records that were authorized to be maintained by the training center; and

d) Other surveillance activities appropriate to the operator's activities at the training center.

NOTE: In all cases, the TCPM's assistance is subject to their office's workload requirements.

D. Training Center(s). A training center's roles, responsibilities, and coordination activities include:

1) Participating in the operator's instructor/check airman standardization program to ensure there is a clear understanding between the center and the operator of exactly what portions (by regulation) of the operator's approved curriculums the center will be conducting.

2) Ensuring the operator has received approval from their POI to use center facilities and personnel in the conduct of their approved curriculums.

3) Establishing a naming convention that will enable operator-approved curriculums/courses to be distinguished from center-approved curriculums. Operator programs are not to be referred to as core or specialty, as these terms are only appropriate for TCPM-approved center curriculums/courses.

NOTE: Training centers are not required to list operator names or the operator curriculums/courses in the center's training specifications (TSpec). Only the center's TCPM-approved core or specialty curriculums/courses are required to be listed in the center's TSpecs.

4) Ensuring that all center personnel used to instruct and/or check on behalf of the operator have been appropriately trained, evaluated, and authorized in accordance with the operator's approved curriculums to conduct such activities. This training must include, at a minimum, training in all portions of the operator's curriculums for which the contract instructors/check airmen are assigned to conduct on behalf of the operator.

5) Ensuring that sufficient contract instructors are qualified to support the operator's training agreement and requirements.

6) Recommending (not qualifying) center personnel as potential contract check airmen. The center must ensure recommended individuals:

a) Have completed the center's approved instructor training program, and

b) Are currently qualified and actively participating in one or more of the center's core curriculums appropriate to the operator's needs.

7) Maintaining the center's FSTDs in accordance with their qualification standards.

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NOTE: If a Simulator Component Inoperative Guide (SCIG) has been developed for a particular full flight simulator (FFS), and the training agreement with an operator includes FFS training, make sure the SCIG has been approved for the operator's use.

8) Advising the operator whenever flight training equipment fails to meet required qualification standards and/or when maintenance problems will restrict training.

9) Ensuring required training records are appropriately maintained and remain readily available to both the Administrator and operator.

10) Ensuring crew pairing policies and procedures are adhered to as it relates to the operator's training and testing/checking.

NOTE: Crew pairing policies and procedures may be found in paragraph 3-4414 below.

11) Advising operators of any proposed revisions to the center's curriculums that are being used partially or in total by the operator.

3-4414 OUTSOURCED TRAINING PROVIDER APPROVAL PROCESS.

A. Application to Outsource Required Crewmember Training.

1) Operators requesting approval to outsource a portion of their required flightcrew member training must submit an application in a form and manner prescribed by the Administrator. The application must contain sufficient detail to enable the Administrator to evaluate the applicant's request. Applications must be submitted a minimum of 60 days prior to the proposed training and contain at least the following information:

a) A copy of the standardization review including an analysis of the training provider's curriculums, courseware, procedures, equipment, facilities, and personnel that will be used in the conduct of the operator's training.

b) A detailed outline, by regulatory reference, of the training elements proposed to be outsourced.

c) If center personnel will be used as contract instructors to conduct the operator's training, the application must contain an appropriate training module developed to qualify center's instructors/TCEs on the operator's curriculum.

d) If center personnel are being requested to act as contract check airmen, the application must contain an appropriate training module developed to qualify center's instructors/TCEs as contract check airmen for the operator. (See paragraph 3-4415 for complete details.)

e) A copy of the operator's instructor/check airman standardization program.

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f) A copy of the operator's proposed surveillance plan to ensure the center continues to provide the agreed training.

g) Proposed method to maintain required crewmember, contract instructors, and contract check airmen training records, including the methodology proposed to ensure curriculum revisions and an appropriate instructor/check airman read file are maintained.

h) Other data that the POI may require to evaluate the application.

2) The approval for an operator to use a part 142 training center or other provider in the conduct of their required training is authorized through the issuance of OpSpec/MSpec/LOA A031. An initial standardization review must be conducted by the operator and submitted to the POI before any contract training or checking may be conducted. OpSpec/MSpec/LOA A031 also requires the operator to conduct ongoing audits of the training center/provider to ensure the training center is continuing to provide training and checking in accordance with the operator's approved program. The initial audit must be completed within 60 days of the commencement of contract training or checking operations. Each audit with evaluation must be presented to the certificate holder's POI for review and acceptance within 30 days after completion. Ongoing audits will be conducted at least every 24 months in order for the operator to continue to use the training center/provider. Guidelines for the scope and content of the operator standardization and audit program are located on the AFS-280 website. Additional information is contained in paragraph 3-4416. If an operator does not conduct the required 24-month audit, their authorization to use the training center/provider will cease on the last day of the 24th month following the date of their last audit. Operators may reapply to use the training center/provider by completing the application process outlined in accordance with the provisions of subparagraph 3-4414A above.

3) A sample outline of the modules and elements of an operator's curriculum that are typically contracted out to a training center can be found on the AFS-280 website. These curriculum checklists have been developed to provide a guideline for the operator and center in determining which regulatory requirements may be satisfied by the training provider and which will be completed by the operator.

B. Flight Training Equipment.

1) In order to receive training/checking/testing credit for the use of a FSTD, the specific FSTD must be a part of the operator's approved curriculum. The subject curriculum and FSTD are a part of the outsourced training audit and must include a comparison of the aircraft flown by the operator to the flight training equipment available at the training center. The comparison should encompass the make, model, and series (M/M/S) (and serial number, in some cases) of the aircraft and FSTD and include a summary of the flight instrumentation, autopilot, flight management system (FMS) equipment, aircraft modifications (electrical system, hydraulic system, engines, propellers, thrust rev, heads-up display, etc.) applicable to each. Regulations require that the flight training equipment fully meet the requirements of the operator's training program and accurately represent the M/M/S of aircraft flown by the operator, including installed equipment. If the flight training equipment available at the training center does not match the operator's aircraft, the operator's program must state how any differences

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between the aircraft and the FSTDs will be addressed and develop an appropriate differences training module.

2) A TCPM's approval of a center's FSTDs for use within the center's approved curriculum does not authorize an operator to use the same FSTDs within the operator's curriculum. The TCPM's approval only ensures that the FSTDs are approved to conduct the training, testing, and checking permitted under part 142. In order for an operator to use a center's FSTDs in support of the operator's curriculum, the operator must include the FSTDs in its training program and have the FSTDs approved by its POI. The operator's POI will evaluate the requirements of the operator's program and make a determination concerning the appropriateness of the center's FSTDs and their qualification as it relates to the operator's curriculum. POIs may request verification of the flight training equipment authorized for use by a training center by contacting the center's TCPM.

3) To receive training credit for a particular FSTD, the FSTD must first be qualified by the National Simulator Program (NSP) (AFS-205) and be assigned a specific level of qualification. TCPMs and POIs may then approve the FSTD for use by a center or operator respectively, by specific maneuver(s), procedure(s), and crewmember function(s). Approval letters are generally issued to operators and centers specifying the FSTD's use within a specific curriculum. Operators are authorized the use of FSTDs through the inclusion of the FSTDs in their training program.

C. Approving/Accepting a Center's Core or Specialty Curriculums for Use by an Operator.

1) Training centers often submit programs to their TCPM for approval that are targeted for specific customers and/or operators. However, these curriculums must meet part 142 requirements and are either "core" or "specialty" as defined by part 142. Once a curriculum is approved by the TCPM, it is listed in the center's TSpecs as a core or a specialty curriculum/course. For an operator to use a center-developed curriculum it must submit the curriculum to its POI for approval. The procedure for approving a center-developed curriculum is the same as if the operator had developed the curriculum or paid a consultant to develop the curriculum. The important point to remember is that when the subject curriculum/course is approved by the operator's POI, it becomes part of the operator's training program and as it relates to the operator, it ceases to be either a core or a specialty curriculum.

2) Once the subject curriculum/course is approved by the operator's POI, the center, when conducting training for the operator, should refer to the subject curriculum by the name given to it by the operator. It is important to note that the training center should not refer to the operator's program as a specialty curriculum. This naming convention is important to clarify oversight and ownership responsibilities for the subject curriculum/course. An operator's programs are approved by its POI in accordance with the appropriate operating rule.

a) Training center curriculums, both core and specialty, are approved by a TCPM in accordance with part 142 and designed to meet the training, testing, and checking requirements of airmen certification under part 61 or 63.

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b) The flightcrew member requirements of parts 91K, 121, and/or 135 differ in numerous respects to part 61 requirements. A TCPM's approval of a center's curriculum does not enable an operator to use such curriculum without the specific approval of the operator's POI.

3) In order for an operator to request a training center's approved curriculum to be incorporated into their program, the operator must first complete a comparison between the proposed center's curriculum to their approved curriculum. All differences must be noted and a training module developed to bridge the differences. This training module will be used to qualify the center's instructors and/or TCEs on the operator's curriculum. It is the operator's responsibility to ensure all center instructors and/or proposed contract check airmen receive training on the differences module(s) developed as a result of the curriculum comparison before they may be authorized as contract instructors or contract check airmen for the operator.

4) The operator may find that a center's curriculum may be used without change but that there may be minor differences in operating procedures and/or checklists. As part of the standardization and audit process, the operator must determine all differences between their curriculum and the center's. If the differences found are minor, the operator's POI may authorize the operator to develop a briefing guide outlining the differences as a suitable method to provide the training necessary to qualify the center's personnel. Major differences between the curriculums will require specialized differences or formal retraining of the center's personnel. In all cases, the operator's regulations require contract instructors and check airmen to be trained in the approved methods, procedures, and limitations for performing required normal, abnormal, and emergency procedures appropriate to the curriculum segment.

5) Operators must have training policies and procedures in their operations manuals or training programs that describe their SOPs and type of operation(s). At a minimum, operators that apply to contract a portion of their required crewmember training to an authorized provider must have policies and procedures in place that clearly identify the following:

a) This portion of the operator's program must clearly define these functions and their procedures to ensure adequate training is conducted and recorded.

b) SOPs, including but not limited to:

- Crew coordination and "callouts,"
- Maneuver descriptions and aircraft configuration,
- Flight deck "flows,"
- Checklist procedures,
- Autopilot use and crew coordination,
- Crew Resource Management (CRM), and
- Approach procedures (including approach charts, crew briefing, Electronic Flight Bag (EFB) use, etc.).

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6) POIs and operators must be aware that training center-approved curriculum are designed to meet the certification requirements of parts 61 and 63 and are not required to include operator-specific items required by part 91K, 121, 125, or 135 training regulations. Part 142 training-center-developed curriculums are required to meet the certification requirements of parts 61 and/or 63 and the associated PTS or ACS. Consequently, part 142 training center curriculums will not comply with the operating rules governing an air carrier and by default do not contain or reference operator-specific requirements or the limitations/authorizations contained within an operator's OpSpecs/MSpecs.

7) If an operator is introducing a new aircraft and requesting the adoption of a center's curriculum in support of the introduction, the operator is responsible for ensuring the proposed curriculum meets their operational requirements. Additionally, the operator must:

a) Evaluate the proposed curriculum and submit it to their POI for approval/acceptance.

b) Develop a module(s) outlining any operator-specific training required to qualify center personnel as contract instructors and or contract check airmen based on the POI's authorized curriculum.

c) If a contract check airman is being proposed, the operator must provide the selected individual with any operator-specific training identified during the curriculum approval process.

d) Submit an appropriate contract check airman request to their POI a minimum of 15 business-days prior to the proposed use of the contract check airman.

8) Table 3-122A, Sample—Weight and Balance Curriculum Module Comparison Chart, provides an illustration of the differences that normally occur when an operator completes a comparison and evaluation of a Weight and Balance (W&B) training module that was designed for a part 142 training center against one designed for an air carrier. The table also illustrates the complexities typically encountered by an operator when conducting a curriculum comparison between their approved training program and that of a training center.

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9) Column A in Table 3-122A lists the elements normally associated with an approved part 142 W&B training module. Column B represents a typical part 135 W&B training module. These differences are a result of the requirements of § 135.293(a)(3), which require operators to train and check their pilots on their (the operator's) method of determining compliance with W&B limitations. Part 142 requires the center's curriculum to comply with part 61, § 61.155(c)(9), which is typically modeled after the manufacturer's procedures. When confronted with these differences, an operator must decide to either:

a) Train and qualify the center's instructors to enable them to conduct the operators approved W&B training module; or

b) Providing there is no negative training involved, permit the center to conduct the manufacturer's weight, balance training, and then conduct a specialized course designed to cover the differences between the center's curriculum and that of the operator. If the operator chooses to permit the center to conduct the center's W&B module, the operator would then be required to convene a separate instructional period to train and test the differences between the center's curriculum and its (operator's) W&B curriculum. This differences training would be required prior to releasing any crewmember for line operations.

c) As mentioned in subparagraph C9)a) above, the operator could elect to provide W&B training to one of the center's instructors in those elements of their curriculum that are different from the center's curriculum. It would then be possible for the qualified instructor to conduct the entire W&B module for the operator's crewmembers. However, without specified training in the operator's procedures, the center may only be authorized to provide training and testing in those subjects that are part of the center's curriculum (Table 3-122A, lines 1–4). In either case, operators must develop a quality control program that will ensure their entire curriculum is conducted in accordance with their approved procedures and conducted by qualified individuals. The Instructor/Check Airman Standardization Program located on the AFS-280 website has been designed to provide assistance in this area.

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Table 3-122A. Sample—Weight and Balance Curriculum Module Comparison Chart

	Part 142 Training Center Curriculum Module and Elements [§ 61.155(c)(9)]	**Part 135 Operator Curriculum Module & Elements [§ 135.293(a)(3)]**	**Equivalent Training Yes/No**
1	Aircraft Manufacturers Weight & Balance Procedures (Airplane Flight Manual (AFM))	Aircraft Manufacturers Weight & Balance Procedures (AFM)	
2	Definitions	Definitions	
3	Limitations	Limitations	
4	Load Shift/Fuel Management and Use	Load Shift/Fuel Management and Use	
5		Operations Specifications (Paragraph A096, A097, A098)	No
6		FAA AC 120-27E	No
7		Carry-on Baggage identification and load and storage	No
8		Passenger Weight determination—average, surveyed, actual	No
9		Baggage/cargo weight determination	No
10		Cabin Configuration and loading	No
11		Baggage Compartment loading and security	No
12		Air Carrier Computation method (computer)	No
13		Manifest preparation	No
14	Testing Module	Testing Module	
Row Number: 1: Topic may comply with the operator's approved curriculum. However, the use of company-developed flip charts, computers, "WIZ Wheels," etc., may require specialized training. Differences evaluation required. 2 through 4: Topics may comply with the operator's approved curriculum. Differences evaluation required. 5 through 13: Topics do not conform to the operator's curriculum. 14: Applicable to the particular curriculum. Differences evaluation required.			

10) The curriculum an operator submits for approval to its POI must contain sufficient detail to assure all required training is addressed. The operator is responsible for submitting the subject curriculum to its POI for review, approval/acceptance, and subsequent inclusion in its training program, before any training is accomplished by the training provider.

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11) This document will be jointly developed by the training provider and the operator, and will specify the division of all tasks required for training/testing/checking between the training provider and the operator. (Other equivalent methods that specify the division of tasks may be acceptable.) The operator bears the primary responsibility to ensure that all ground and flight training required by their specific operating rule is conducted and appropriately evaluated. The POI's oversight responsibility is to ensure that the operator's compliance efforts are satisfactory. The POI should check signoffs (certifications) of ground training and all testing for completeness, and should cross-check those signoffs against the source document showing the division of tasks. For example, part 135 operators must ensure the training required by § 135.345 is conducted and all subjects required by §§ 135.293, 135.297, and 135.299 are evaluated. A properly executed standardization document between the operator and the training provider will provide guidance to both parties concerning the training and testing/checking obligations for each party. A sample Instructor/Check Airman Standardization Program is located on the AFS-280 website.

NOTE: Training centers are not certificated as air carriers or commercial operators and are not issued OpSpecs/MSpecs. The operator-specific requirements of an air carrier's operating regulations make it impossible for a part 142 training center to have a training curriculum approved under those regulations. TCPMs may only approve training center curriculums that comply with part 142. Training centers may develop curriculums designed to comply with the operating rules of an air carrier; however, the curriculums cannot be approved as "meeting" the requirements of those parts. Training center instructors and evaluators are likewise qualified in accordance with a center's approved curriculums and therefore cannot conduct an air operator's training without first being qualified by an air operator before conducting any of the operator's required training. (Refer to §§ 91.1089 through 91.1095, §§ 121.411 through 121.414, and §§ 135.337 through 135.340.) Depending on the content of a particular center's instructor/TCE training curriculum, an operator may be able to credit a portion of the center-provided training as meeting some of their required instructor/check airman training requirements.

12) When a center revises one of their core or specialty training curriculums that originally formed the basis of an operator's approved curriculum, the center should be encouraged to advise the operator of the revision. However, it is important to understand that revisions to a center's core or specialty curriculums, which were used as the basis of an operator's training curriculum, does not automatically create a revision to the operator's POI-approved course. The adoption of such changes is subject to the operator's evaluation and approval by its POI. Center revisions that are considered appropriate for the operator's program may be incorporated by the operator if approved by the operator's POI. Likewise, the operator may make changes to its curriculum, in which case they must notify the center and ensure that all contract instructors and contract check airmen are trained in the new procedures (differences). Operators must be especially vigilant to ensure that changes to the training center's core or specialty curriculums do not affect the training they receive.

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D. Air Carrier Training at Multiple Training Centers.

1) Occasionally, an air carrier will request that training be conducted at two or more training centers. These centers may be owned by the same parent company, satellite centers of the same certificate holder, or may be training centers operated by different companies. It is common practice for training centers operated by different owners/companies to take varied approaches to curriculum design and development for the same aircraft M/M/S. These differences often include training equipment, training hours, maneuver description, operating procedures, and checklists. When evaluated individually, each variant may be perfectly acceptable for the specific aircraft; however, as training products for an air carrier these differences, although subtle, are not consistent with the standardization requirements demanded by air carrier regulations. To ensure standardized training is provided, it is essential that before authorizing the use of multiple sources of training, the air carrier and subsequently the POI determine that the same curriculum and syllabus, including courseware, flight training equipment, maneuver descriptions, procedures, checklists, etc., will be conducted by each provider.

2) Subtle differences between or among training providers may not create standardization difficulties for noncertificated operators. However, because air operators are required to have their own approved programs, differing curriculum between or among training providers is not authorized. Training conducted by different centers will present a standardization problem if not properly monitored and managed by the operator.

3) To qualify a center's personnel to conduct an operator's training curriculums will require the operator to conduct an evaluation of the center's curriculums to determine what, if any, differences exist between the two and provide center instructors and evaluators training in those differences. This process must be repeated for each center authorized to conduct training for the operator. If a contract check airman is requested, the additional training appropriate to the operator's check airmen training will also have to be completed.

4) If POIs have reason to believe that multiple centers can provide the quality training required by the operator's approved curriculum, they may authorize two or more facilities or training companies to conduct the subject training. However, if the POI suspects that an operator curriculum cannot be adequately presented at multiple centers due to differing delivery methods, FSTDs training hours, maneuver descriptions, qualified personnel, etc., and/or the operator's ability to adequately monitor and audit the training being provided, the POI and the operator have the responsibility to limit the number of training providers.

E. Training Policy and Procedures.

1) Operators are required to develop and document, as part of their approved program, adequate procedures and policies to ensure all training providers conduct the operator's crewmember training as approved. These procedures may be part of the operator's manual used by the certificate holder's flight personnel in conducting its operations and/or contained in the operator's approved training program.

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2) Operators must establish training policies and procedures to ensure crewmembers are trained and evaluated in accordance with the policies and procedures that represent the manner in which it conducts its aircraft operations. It is unacceptable to have differences between training/checking and actual aircraft operations or between individual crewmembers.

3) POIs are not to approve requests for outsourced training unless the operator's program contains appropriate policies and procedures to ensure the training conducted by the authorized training provider(s) is in accordance with the operator's approved program.

NOTE: Operators must ensure that approved training providers are provided at least one copy of their operating manual(s), including the revision service for such manuals, which cover the particular areas that the training provider has been approved to conduct. The operator must also ensure the training provider maintains a "read file" specific to the operator that is available to all contract instructors, contract check airmen, and the operator's crewmembers. This read file must contain information pertinent to their flight operations and crewmember operating procedures. Refer to the Instructor/Check Airman Standardization Program on the AFS-280 website for additional information.

4) An operator that determines a center-developed curriculum is suitable for its use must receive its POI's approval to integrate the subject curriculum into its training program. See subparagraph 3-4414C for policies and procedures for the integration of a center's curriculum into an operator's program.

F. Crew Pairing.

1) Training centers often provide services to air operators, which must meet requirements of particular operating rules (i.e., parts 91K, 121, and 135). Under these rules, training programs include checklists, callouts, profiles, approach procedures, and other features that are approved for the specific air operator by its assigned POI. Occasionally an operator may not be able to assign a complete crew for its training/checking/testing activities at part 142 training centers. When this situation occurs, the training center may provide a qualified crewmember that meets the requirements outlined in the operator's training program.

2) The FAA promotes the crew concept in air carrier training and checking to ensure that crew coordination and other flight management issues are adequately and appropriately addressed. Flight training must address the performance of duties as Pilot Flying (PF) and pilot monitoring (PM) as described in the air operator's approved procedures. To meet both of these seat-dependent training needs, each required flight deck crew position must be occupied by a qualified crewmember.

3) It is desirable that each flight training session be scheduled so that two pilots from the same company or air operator may be trained during a single flight training session. The preferred crew pairing is a pilot in command (PIC) and a second in command (SIC). Other acceptable crew pairings are two PICs or two SICs employed by the same certificate holder. Each pilot receiving training should have completed the appropriate aircraft ground training, including basic indoctrination, prior to beginning the flight training segment.

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4) Permissible crew pairings. Some air carriers often operate with small pilot rosters or with pilots who are widely dispersed. Providing the operator's training program does not otherwise restrict crew pairings for flight training/checking/testing in a FSTD at a training center, the center may use the following guidelines when determining who may be considered an appropriate crewmember.

a) An appropriate crewmember must be one of the following:

1. One of the air carrier's line qualified pilots,

2. One of the air carrier's pilots undergoing training for the same aircraft, or

3. A contract flight instructor (airplane or simulator) or a contract check airman (airplane or simulator) who is authorized to serve in that air carrier's training program.

b) The following conditions apply when a part 135 air carrier pilot is training in an FAA-approved training program for another part 135 air carrier, whose training program is essentially similar.

- When the training curriculums are not essentially similar, pilots may not be paired; similarly, when operational differences between carriers are too pronounced or too numerous, at the discretion of the appropriate POI, pilots may not be paired.
- Each air carrier pilot must be trained in accordance with the training program approved by the POI of his or her own air carrier.
- Minimum equipment lists (MEL), OpSpec/MSpecs, and other features specific to each air carrier's operations must be addressed during flight training.
- When only one pilot is receiving flight training, the other pilot seat must be occupied by a person who is line qualified or line familiar in the specified duty position (refer to the current edition of Advisory Circular (AC) 120-35, Flightcrew Member Line Operational Simulations: Line Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation, for definition of terms), unless the flight training is being conducted for single pilot operations.

NOTE: Training programs may be viewed as essentially similar when they include the same curriculum, the same checklists, and the same callouts and include flight deck configurations, operational procedures, and fms that are compatible in the judgment of the appropriate POI.

c) Pilots must have completed the operator's applicable ground training curriculum segments prior to starting the flight training curriculum segments.

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5) Pairing pilots in flight training and evaluation for operations under different parts. When pilots from different operators are paired in training programs that are essentially similar, the operator-specific features (such as MELs and OpSpecs/MSpecs) of each operator must be addressed. Pilots in training for part 135 operations should not routinely be paired with pilots training for operations under part 91. These crew pairings should be avoided in favor of the pairings outlined in subparagraph 3-4414F4). However, such crew pairings are permissible provided the following conditions are met:

a) The part 91 pilot must conform to the training program of the part 135 pilot in every respect. Specifically, checklists, profiles, approach procedures, and callouts must be those used in the training program of the part 135 pilot (not vice versa), and the part 91 pilot must understand and apply CRM principles in accordance with the air transport pilot PTS or ACS, as applicable.

b) Each certificated air operator's crewmember must complete the appropriate air operator's evaluation module. Part 135 pilots may support the part 91 pilot's training activities as appropriate.

c) Part 91 pilots paired with an air operator crewmember must use the operator's approved curriculum. In these cases, the TCPM must either concur with the part 91 pilot's use of the air operator's curriculum to complete required training and currency, or approve a documented process submitted by the training center that ensures all requirements described herein are met. The training center should maintain records of such pairings in sufficient detail to allow FAA inspectors to easily determine compliance with the applicable regulation, operator's crew pairing procedures (if provided), and these requirements.

d) The part 91 pilot must have received differences training in the features of the part 135 training curriculum that distinguishes it from the part 91 training curriculum. That training should also include the operator's OpSpecs and operational control procedures.

NOTE: In crew pairings involving pilots of different part 135 operators or pilots operating under different operating rules (parts 135 and 91), POIs and TCPMs must be especially vigilant. The part 135 operator's training program must not be distorted or diminished in order to accommodate dissimilar training needs. If the integrity of the air carrier training program cannot be upheld, the crew pairing must not be permitted.

G. Recordkeeping.

1) Regulations require an operator to maintain training and qualification records for each crewmember, flight instructor, and check airman. This requirement includes contract instructors and contract check airmen employed by training providers that are authorized to provide training and checking for the operator. The means and methodology of maintaining required crewmember records must include an acceptable process to record training, checking, and qualifications of the operator's crewmember training conducted by an outsourced training provider. The operator's training program should contain a description of their recordkeeping system, as well as describing what records are to be used to comply with each regulatory

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requirement. If the operator wishes to use an electronic recordkeeping system, the current edition of AC 120-78, Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals, provides guidance for the evaluation and approval of these systems.

2) Operators and training providers must establish and document procedures to ensure they have a clear understanding of their individual responsibilities for complying with required training and testing/checking recordkeeping requirements. These procedures must include identification of responsible personnel and approved location(s) where specific records will be maintained.

3) Training conducted by center personnel must be documented in accordance with the operator's approved system. Center personnel acting as contract instructors and/or contract check airmen for the operator must also be trained in the operator's records system.

4) Training centers are not required under part 142 to maintain an air carrier's crewmember training records when the training was accomplished in accordance with the operator's approved program. Training centers are only required to maintain the records required to support the training accomplished under part 142 that leads to airman certification or proficiency required by part 61 or 63. An operator's crewmembers are not trained and evaluated in accordance with part 142. They are trained and evaluated in accordance with the operator's operating regulations and approved curriculums. Therefore, the responsibility for record maintenance remains with the operator. Training centers that have been authorized to provide training for an operator are considered to be an integral part of that operator's training program. In that context, FAA policy permits the center to be used as a suitable location for required records if approved by the operator's POI. Many training centers provide a large portion of an operator's training and in some cases are the sole providers of such training, which may make the center a logical location for such records.

5) Part 142 requires training centers to maintain the training records of their instructors and TCEs. When these individuals are also approved as contract instructors and/or contract check airmen for an operator, it may also make sense for the operator to have its instructors and/or check airmen records maintained by the center. It is, however, the responsibility of the operator to ensure that all crewmember records are readily available for inspection as required by applicable regulations.

6) Operators must ensure that training records developed and maintained by their training providers are readily available to the operator. Records of crewmember training and checking are required to be furnished to the operator upon completion (within 24 hours) of any training and/or checking in order to enable the operator to determine qualifications for crew assignment(s). Training and qualification records for contract instructors and contract check airmen must also be made readily available to the operator.

7) In many cases, the TCPM will be the best qualified individual to assist the POI with required inspections, proficiency checks, and observations of assigned operators. Properly maintained records will also enable the TCPM and training centers to provide information on instructors and TCEs to other operators that may need instructor and evaluator assistance.

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8) A TCE who is authorized as a contract check airman may be approved by one or more POIs to conduct checks for multiple operators that have contracted with a training center. This may occur when multiple operators of the same aircraft type have contracted for training at the same center and are using essentially the same curriculum.

9) Although not required, training centers that maintain contract check airman records for operators may be a good source of information for other operators who are evaluating center personnel as potential contract check airman.

10) Training centers must have a process whereby they keep customers apprised of all training or checking conducted on the operator's behalf. Additionally, the center must notify the operator within 24 hours if there is a job functions status change with a TCE or instructor who is also a contract check airman or contract flight instructor for the operator that may affect the individual's check airman or instructor status with the operator.

11) TCPMs are responsible for maintaining eVID information regarding the training center, its instructors, and evaluators. POIs are responsible for maintaining eVID files pertaining to each training center employee authorized as a contract check airman.

3-4415 REQUIREMENTS TO AUTHORIZE CONTRACT FLIGHT INSTRUCTORS AND/OR CONTRACT CHECK AIRMEN FOR AN AIR OPERATOR.

A. Requirements. Sections 91.1073(a)(4), 91.1075(b)(4), 121.401(a)(4), 121.402(b)(4), 135.323(a)(4), and 135.324(b)(4) require operators to provide enough flight instructors and check airmen to conduct the flight training and flight checks required by the applicable operating rules.

1) The determination of a "sufficient" number of contract check airmen and/or contract instructors for a particular operator will require a careful evaluation of the following:

- Number of APDs authorized by the FAA and employed by the operator;
- Geographic location of the operator with respect to available FAA support;
- The operators understanding that they are required to provide surveillance and supervision of their contract instructors/check airmen;
- Availability of FSTDs and location relative to the domiciles of the operators' crewmembers; and
- Operators required crewmember training and evaluation workload.

2) There is no fixed formula that will definitively answer the question of how many contract check airmen/instructors are appropriate. Maintaining an equitable balance between the operator's ability to provide required management oversight and surveillance, while meeting their evaluation requirements without compromising standardization or safety, is a primary concern.

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B. Qualification and Training Requirements. The qualification and training requirements for individuals to become contract flight instructors and/or contract check airmen for an air carrier are outlined in the specific regulations governing the type of operation (specifically part 91K, part 121 subpart N, and/or part 135 subpart H, as appropriate). Training center instructors and evaluators are trained and qualified under part 142, which does not mirror the instructor and/or check airman qualification requirements of an air carrier. Although some of the instructor/evaluator training required by part 142 may be considered equivalent to the instructor/check airman training required by an air carrier, the two currently do not align. The differences between these two regulatory requirements will generate additional training requirements for training center instructors and evaluators selected to provide training and checking services for operators.

C. Instructors. Consider the case of a part 142 training center flight instructor (simulator) who is qualified to provide instruction under the training center's approved core curriculum for a particular aircraft.

1) In order for a training center instructor to serve as a flight instructor for an air carrier, the individual must be trained and qualified to instruct in each training segment, module, or element of the air carrier's curriculum that the instructor will be responsible for providing to the air carrier's crewmembers. Current policy does not require center instructors to complete the carrier's entire approved training program or curriculum provided:

a) The individuals are limited to conducting only the training elements of the operator's curriculums that they have been specifically trained and qualified to conduct and have been authorized by the operator; or

b) The individual has previously received the same training, proficiency/competency checks, and observations in the same M/M/S aircraft for another air carrier operating under the same part.

2) Situations where an air carrier adopts a training center's core or specialty curriculum(s) and the POI approves these curriculums as part of the air carrier's training program would also mitigate some of the training required by the operator to qualify the subject instructor. In this situation the only training the air carrier would be required to provide the center's instructor(s) would be limited to any differences that exist between the training center's curriculum(s) (as approved by the TCPM) and the air carrier's training curriculum (as approved by the carrier's POI).

NOTE: In such cases, it is the air carrier's responsibility to identify each difference between the carrier's approved training curriculum (including curriculum content, checklists, and procedures) and the training center's curriculum. The air carrier must then develop and provide their POI a training module to qualify the center's personnel on all noted differences. This differences training module must be approved by the POI prior to conducting the subject training.

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3) The air carrier's POI has the responsibility to determine if the manner and method proposed by the air carrier to train and qualify the center's personnel on curriculum differences, will meet the operator's training requirements.

D. Review. To ensure the center's personnel meet the operator's check airman standards, the operator will need to review the individual's training history and qualifications.

1) Elements of the center's instructor/TCE training curriculums that the operator finds equivalent to their training program may, with the POI's approval, be credited toward the completion of the operator's instructor/check airman curriculums. If the center's curriculum has been submitted to the POI for approval and is approved as meeting the requirements of the operator's curriculum, other than the operator-specific items, no additional training for the center's personnel would be required. Any differences or deficiencies noted will require the operator to develop a training module to ensure all regulatory requirements are met in order to qualify the center's personnel as contract check airmen.

2) In addition to the instructor qualification and testing requirements outlined in subparagraphs 3-4415B and C, operators must accomplish the following to qualify an individual as a contract check airman:

a) Evaluate the instructor/TCE's credentials to ensure he or she meets the certificate holder's requirements to become a contract check airman.

NOTE: Individuals must have at least one year of experience as a center instructor or TCE in the make and model (M/M) aircraft in order to be considered as a contract check airman for an operator. POIs are encouraged to contact the center's TCPM for assistance with the review and potential approval of contract check airmen. TCPMs are often the POI's best source of information relating to a center's operation and personnel.

b) Evaluate the center's instructor and TCE training curriculum by comparing it to the operator's check airman curriculum to determine the differences training required to qualify the center's personnel as a contract check airman.

c) Develop an appropriate differences training module(s) to include the operator-specific elements of the check airmen qualification and training/checking regulations to qualify the center's instructor/TCE as a contract check airman.

d) Submit the contract check airmen training module(s) to its POI for acceptance/approval.

e) If the training course is approved, ensure the course is provided to all contract check airmen candidates.

f) Provide the POI with complete training records and submit the individual's name and résumé for review and approval in accordance with Volume 3, Chapter 20.

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g) If the applicant is approved as a contract check airman, the POI will make the necessary eVID entries.

NOTE: POIs should notify the center's TCPM whenever they authorize one of the center's personnel to act as a contract check airman. This may be accomplished by forwarding the TCPM a copy of the check airman's LOA. A sample contract check airman LOA is located on the AFS-280 website.

E. Categories of Authorization. The standard categories of authorization for check airmen currently shown in Volume 3, Chapter 20 do not provide the level of specificity required for the approval of contract check airmen. For example, an operator's check airman, qualified as a line captain may be authorized as a simulator only check airman permitting him or her to administer both § 135.293(a)(1) through (9) as well as § 135.297 evaluations. A contract check airman who is only qualified in the aircraft-specific modules of an operator's curriculum may be authorized to conduct simulator-only evaluations; however, he or she would be limited, due to his or her training, to evaluations of § 135.293(a)(2) and (b) and § 135.297 evaluations. Unless the contract airman is qualified in the operators complete curriculum for the specific aircraft, he or she may not be authorized to conduct the elements required by § 135.293(a)(1) or (a)(3) through (9). Other restrictions may also apply depending on the training and qualification provided by the operator. A sample contract check airman LOA is located on the AFS-280 website.

F. Training of Instructors and Evaluators.

1) Because the typical training program offered by the training center currently does not include all of the ground training subjects contained in an operator's curriculum, it follows that neither the trainees nor the instructors and evaluators themselves receive training in those subjects. It is important to ensure all training center instructors and evaluators are trained and evaluated in all subjects that the center is contracted to conduct. For example, because the typical training program offered by the training center currently does not include ground training in the subjects contained in § 135.293(a)(1) and (a)(4) through (9), it follows that neither the trainees nor the instructors and evaluators themselves receive training in those subjects. Therefore, a TCE typically is not qualified to evaluate subjects other than those contained in the center's core curriculum, which equates to § 135.293(a)(2) and potentially (3). Similarly, a trainee should not be evaluated in those subjects by individuals not qualified in the operator's procedures.

NOTE: To preclude any confusion concerning a contract check airman's authorization, the POI must specify in each contract check airman's LOA what specific subjects the check airman is authorized to test and check.

2) Particular caution must be exercised to ensure that individuals being nominated by an air carrier to become contract instructors/check airmen have a good understanding of the issues typically faced by crewmembers on a daily basis, many of which are learned only through the completion of an air carrier's initial new-hire training curriculum. Knowledge of an air carrier's operational environment becomes very important when instructors/check airmen may be required to draw upon that knowledge to ensure that the quality of training and evaluations demanded by the regulations is not compromised. Non-aircraft-specific issues such

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as flight following/dispatch, MEL/Configuration Deviation Lists (CDL), cabin crew/flightcrew interactions, hazmat, security, company SOPs, etc., play an important role in a crewmember's training; especially during Line-Oriented Flight Training (LOFT) events. To effectively function as an air carrier instructor/evaluator, individuals must have a good understanding of these issues.

3) Before an air carrier authorizes a contract instructor or nominates an individual to become a contract check airman, the air carrier must provide its POI with evidence that these individuals have completed at least one air carrier's initial training and qualification curriculum as a flightcrew member for an operator certificated under the same 14 CFR part. Providing the operator and the assigned POI find this training and qualification acceptable, individuals may be considered to have met the non-aircraft-specific training requirements to become a contract instructor/check airman. The completion of an operator's line check requirement(s) is not required. Following the completion of an appropriate differences training curriculum, the subject individuals may be authorized as contract instructors and nominated to become contract check airmen. This process should preclude an individual from conducting training and checking in an air carrier environment without ever having had the benefit of, at a minimum, the training required to qualify an individual to act as required crewmember for an air carrier.

G. Proficiency Evaluations. The proficiency evaluations required by an air carrier to qualify and maintain the currency of its check airmen are also applicable to center personnel that are being nominated as contract check airmen for the operator.

NOTE: TCPMs are only required to verify that the center's TCEs receive annual training on the conduct of part 61 certification functions in accordance with part 142 subpart C, relating to the curriculums approved for the training center's use. As outlined above, this training and checking does not qualify an individual to act as an operator's check airman. Operators must complete a detailed comparison between its check airman curriculum and that of the training center's TCE curriculum to determine the extent of the additional training they must provide to qualify the center's personnel to act as a contract check airman on their behalf. If this comparison indicates that the operator's training programs are identical, other than the operator-specific items, no additional training for the center's personnel is required. Any differences noted between the curriculums will require the operator to develop a training module to qualify the center's personnel as a check airman. This module must be presented to the operator's POI for approval/acceptance.

H. Contract Instructors/Check Airmen. Training center employees that have been qualified by an operator to serve as a contract instructor/contract check airman may be considered qualified to act in the same capacity for another operator provided that:

1) Both operators are certificated under the same 14 CFR part.

2) Both operators are operating the same M/M/S of aircraft with identical configurations.

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3) Both operators are using identical training curriculums, including checklist and operating procedures.

4) The requesting operator finds the subject individual acceptable as a contract instructor/check airman.

5) The subject instructor/check airman has met the operating or observation experience requirements for at least one operator for which they are providing services. For example, if a training center instructor is qualified to provide instruction in a particular aircraft for three different operators, the instructor may be considered to have met the initial and recurrent line operating or observation requirements for all three by remaining qualified in one of the operator's programs.

NOTE: In all cases, the acceptance of an instructor/check airman's qualification by another operator is subject to the approval of the requesting operator's POI.

I. Reports. The POI should arrange to have the operator provide the POI with a periodic report of each check airman's checking activities, including a pass/fail rate, to coincide with the POI's periodic review (annual, semiannual, or other). POIs may arrange for these reports to arrive at a time that meets the POI's needs. A contract check airman should be active enough to retain the required knowledge and skills. This activity level may vary depending on the contract check airman functions and other operators for which he or she is authorized check airman activities, the size of the operator, and the number of approved check airmen. Usually a check airman should conduct at least eight authorized check airman activities during a 12-month period (including supervision of Operating Experience (OE)). The POI should specifically reassess the operator's need for those check airmen whose records indicate low activity levels.

3-4416 OUTSOURCED TRAINING PROVIDER AUDITS AND ASSOCIATED OPSPEC/MSPEC PROCEDURES.

A. Self-Audit Program. The FAA requires a mandatory self-audit program for operators certificated under the provisions of part 91K and 14 CFR part 119 who contract with a training provider to conduct a portion of their required crewmember training. Such training arrangements are informally known as outsourced training. POIs will use OpSpec/MSpec/LOA A031 to record FAA approval of these contract training arrangements.

B. Operator Responsibility. The FAA is often limited in its ability to oversee an air carrier's training operations conducted under contract by a training provider(s). This oversight is the primary responsibility not of the FAA, but of the operator itself. The operator holds an air carrier certificate as a privilege granted by the Administrator on the presumption that the operator will continually maintain the highest safety standards, including flightcrew training standards. The operator must ensure that its flightcrew training conducted by a contractor continually meets the requirements set by regulations and the standards contemplated at the time of initial certification.

NOTE: The current edition of AC 120-59, Air Carrier Internal Evaluation Programs, recommends a voluntary self-audit strategy for air carriers that may

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be readily adapted to continuing analysis and surveillance of outsourced flightcrew training.

C. Self-Audit and Summary Report. The self-audit and summary report cycle outlined in this section may be used as the first phase of a plan to implement more effective operator-driven quality assurance (QA) where outsourced flightcrew training is concerned. The cycle must be conducted at least every 24 months in accordance with OpSpec/MSpec/LOA A031, and should be conducted at any time that a major change affects the operator's outsourced flightcrew training.

D. POI Verification. POIs must verify that their operators arranging with training providers to conduct contract training for their crewmembers, otherwise known as outsourced training, will accomplish the following activities.

1) Self-Audit.

a) Training Program Components: Adherence to Approved Program. The operator must document that the training program delivered by the training provider is identical to the training program approved for the operator's use by the POI. The documentation will address at least the following:

- Manuals;
- The format and content of curriculums, curriculum segments, training modules, and documents depicting flight maneuvers and procedures;
- Courseware;
- Facilities; and
- Qualifications of instructors and check airmen.

b) Training Curriculums: Adherence to Approved Program. The operator must audit curriculums and document that those curriculums presented by the training provider adhere to the curriculums contained in its FAA-approved training program. The documentation must address at least the following, including ground training and flight training curriculum segments:

- Initial new-hire training;
- Upgrade training;
- Transition training;
- Recurrent training;
- Refresher training (part 121 only);
- Initial equipment training;
- Requalification training; and
- All other approved training such as differences, related aircraft differences (part 121 only), hazmat, security, and CRM, as appropriate.

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c) Flight Training and Testing/Checking: Adherence to Approved Program. The operator must observe all contract instructors and contract check airman who are conducting required instruction and evaluations on their behalf by center personnel. The operator must document that regulations contained in §§ 91.1089 through 91.1095; §§ 121.411 through 121.414; or §§ 135.337 through 135.340, as appropriate, are being met and that approved standards are being maintained. Documentation must address at least the following, as applicable:

- Certification flight checks;
- Proficiency checks, and instrument proficiency checks (parts 91 and 135 only);
- Flight checks (part 121 Flight Engineer (FE));
- Flight training in lieu of the proficiency check, including LOFT;
- Competency checks;
- Maneuver validation (Advanced Qualification Program (AQP)); and
- Line operational evaluations.

d) Training Records: Completion of All Approved Training. The operator must review required training and testing records to ensure compliance with their operating rule. This review must cover all of the operator's crewmembers, including pilots, FEs, and flight attendants (F/A) who have received outsourced training since the last review cycle. The operator must document that each crewmember has successfully completed all of the required components of training and checking comprised by its approved training program.

2) Summary Report. The operator must prepare a report, summarizing the findings of its self-audit. A sample report is on the AFS-280 website. This sample report form may be used to compile self-audit findings and to submit findings to the POI as a summary report. Another form mutually acceptable to the operator and the POI may be used instead. The summary report must be signed by the operator's director of operations. In all instances that discrepancies are found between the training program delivered by the training provider and that which is approved by the FAA, the operator must propose effective remedies. Those remedies must be included in the summary report and must be addressed under the following categories:

a) Immediate corrective action:

1. Action already taken, showing dates; and

2. Action planned, showing target dates.

b) Long-term corrective action, showing target dates; and

c) A strategy for ensuring continuing prevention of recurrence.

3) OpSpec/MSpec/LOA A031. All affected operators are required to be issued OpSpec/MSpec/LOA A031. Any training provider conducting contract training, within the meaning of this section, must be approved by the POI and recorded in OpSpec/MSpec/LOA A031.

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E. Program Discrepancies. An operator contracting for training must address any training program discrepancy and undertake corrective action as soon as the discrepancy becomes known. When the operator's own remedies are insufficient, the POI must take additional steps as deemed necessary and appropriate, in accordance with applicable provisions of Title 49 of the Code of Federal Regulations (49 CFR), 14 CFR, this order, and the current edition of FAA Order 2150.3, FAA Compliance and Enforcement Program.

NOTE: For guidance in accomplishing an Internal Evaluation Program (IEP) evaluation, refer to AC 120-59 and Volume 3, Chapter 28, Section 1, Air Carrier Management Effectiveness.

F. New Outsourced Training Arrangements. When approving new outsourced training arrangements for part 91K use the regular PTRS recording procedures for the appropriate job function and enter "Contract" in the "National Use" field.

RESERVED. Paragraphs 3-4417 through 3-4432.

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VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 3 AIRPLANE PERFORMANCE AND AIRPORT DATA

Section 1 Safety Assurance System: Airplane Performance Computation Rules

4-486 GENERAL. This chapter contains direction and guidance to be used by inspectors for reviewing and approving performance data sections of Company Flight Manuals (CFM). This chapter also contains guidance for accepting or approving an operator's system for acquiring airport data. This section is related to Safety Assurance System (SAS) Element 3.2.1 (OP) Aircraft Performance Operating Limitations.

A. Chapter Contents. Section 1 of this chapter, Safety Assurance System: Airplane Performance Computation Rules, is intended as background and reference material. It contains basic explanations of the terms and concepts used in airplane performance computations. Section 2, Safety Assurance System: Airplane Performance Rules, contains detailed information on the rules applicable to specific airplanes. Section 3, Safety Assurance System: Approval of Performance Data Sections of CFMs, contains specific direction and guidance for the review and approval of performance data sections of CFMs. Section 4, Safety Assurance System: Airport Data Acquisition Systems, contains specific direction and guidance for the review and approval of airport data acquisition systems. Section 5, Safety Assurance System: Selected Practices, contains direction and guidance concerning specific related topics.

B. How to Use This Chapter. Inspectors should first determine the specific make and model of aircraft involved. In many cases, inspectors must know which modifications have been performed by a Supplemental Type Certificate (STC). Next, inspectors must determine the specific paragraphs that apply to the airplane from Table 4-9, Airplane Categories for Performance Computation Purposes. An inspector who is generally familiar with the terms and concepts involved may then consult the specific paragraph in Volume 4, Chapter 3, Section 2. Inspectors who are not familiar with the terms and concepts involved will find it useful to review the background material contained in Volume 4, Chapter 3, Section 1 before proceeding to Volume 4, Chapter 3, Section 2.

4-487 OVERVIEW OF AIRPLANE PERFORMANCE RULES. Aircraft performance requirements are contained in Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 121, and 135, as applicable.

A. Certification Limitations. Part 91, § 91.9 requires that all flight operations (both air transportation operations and others) be conducted within the limitations approved for that aircraft. These limitations are determined by the Aircraft Certification Service (AIR). Since March 1, 1979, these limitations must be published in an approved Aircraft Flight Manual (AFM) or an approved Rotorcraft Flight Manual (RFM). Before March 1, 1979, the limits could also be presented as placards or by other means. Specific limitations are presented as maximum and minimum values, such as the maximum takeoff weight (MTOW).

B. Performance Limits. Part 121 subpart I and part 135 subpart I require operators conducting air transportation operations to conduct those operations within specified performance limits. Operators must use Federal Aviation Administration (FAA)-approved data

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to show compliance with these regulations, supplemented as necessary with manufacturers' advisory data, for wet and contaminated operations. The aircraft certification rules require the manufacturer to determine the aircraft's performance capabilities at each weight, altitude, and ambient temperature within the operational limits. The performance section of the AFM or RFM presents variable data in tabular or graphic format. Operators must use data extracted from the performance data section of the AFM or RFM to show compliance with the operating rules of part 121 or part 135. For those aircraft certified without an approved flight manual, the FAA-approved data may be placed on placards or placed in an approved CFM.

C. Advisory Information. Aircraft manufacturers occasionally publish advisory information in flight handbooks that is not required for certification and which, therefore, has not been placed in the limitations section of the AFM or RFM. For example, manufacturers of light multiengine aircraft certified under 14 CFR part 23 frequently publish accelerate-stop distances as advisory information. When such information is not placed in the limitations section, it is not a limitation. Inspectors are advised that operators who do not observe such advice are not exhibiting good judgment and may be in violation of § 91.9. Principal operations inspectors (POI) should ensure that operators enforce such limitations by placing appropriate policy statements in a section of the General Operations Manual (GOM).

D. Date of Aircraft Certification. As aircraft performance and complexity have increased, more stringent operating limitations have become necessary for operators to maintain an Acceptable Level of Safety (ALoS). Certification and operating rules have also become correspondingly more complex. Once an airplane is certified, however, it normally remains in production and in service under the original rules even though those rules have been superseded. Part 121 subpart I and part 135 subpart I contain a number of sets of rules to account for the progressive enhancement of safety standards. These rules frequently refer to superseded airplane certification rules and effective certification dates. When determining which performance rules apply to a specific airplane, inspectors must determine the airplane date of certification, the certification category, and the aircraft size. This information can be found on the Type Certificate Data Sheet (TCDS). Modifications by the STC document the certification basis for the change only. If the modification changes the certification category of the aircraft, a new model designation is usually assigned. Table 4-9 contains a summary of the categories into which airplanes have been divided for the purpose of performance computations under parts 121 and 135.

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Table 4-9. Airplane Categories for Performance Computation Purposes

AIRPLANE GROUPING	CHARACTERISTICS
LARGE TRANSPORT CATEGORY	• More than 12,500 lbs maximum takeoff weight (MTOW). • Certified under Civil Aviation Regulation (CAR) 4, CAR 4a, CAR 4b, Special Civil Air Regulation (SR)-422, SR-422A, SR-422B, or 14 CFR part 25.
LARGE NONTRANSPORT CATEGORY	• More than 12,500 lbs MTOW. • Certified prior to July 1, 1942, under Aero Bulletin 7A.
SMALL TRANSPORT CATEGORY	• Not more than 12,500 lbs MTOW. • Certified under CAR 4, CAR 4a, CAR 4b, SR-422, SR-422A, SR-422B, or part 25.
COMMUTER CATEGORY	• Up to 19,000 lbs MTOW, 19 passenger seats. • Reciprocating or turbopropeller. • Certified under 14 CFR part 23. • Defined as small for performance computation purposes and large for purposes of pilot certification.
NORMAL CATEGORY—OVER 12,500 LBS	• Certified under part 23 and 10 to 19 passenger Special Federal Aviation Regulation (SFAR) 41, subparagraph 1(b). • 19 passenger seats and 19,000 lbs MTOW. • Defined as a small airplane for performance computation purposes and as a large airplane for pilot certification by SFAR 41.

NORMAL CATEGORY—12,500 LBS OR LESS	• 12,500 lbs or less MTOW, 10 to 19 passenger MTOW.
	• Certified under CAR 3 or part 23 and one of the following, including:
	  • Supplemental Type Certificates (STC);
	  • Special conditions (SC) of the Administrator;
	  • SFAR 23; and
	  • SFAR 41, subparagraph 1(a).

NORMAL CATEGORY—9 OR LESS PASSENGER SEATS	• 12,500 lbs or less MTOW. • Certified under CAR 3 or part 23.

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4-488 LARGE AIRPLANE CERTIFICATION. On July 1, 1942, Civil Aviation Regulation (CAR) 4, Airplane Airworthiness, became effective, establishing the transport category for the certification of large airplanes. Large airplanes were first defined in this rule as airplanes of more than 12,500 pounds MTOW.

A. Large Nontransport Category Airplanes. Large airplanes certified under Aero Bulletin 7A, Airworthiness Requirements for Aircraft (before the establishment of the transport category), are now referred to as large nontransport airplanes in the performance rules. Only three of these airplanes are still in active service that inspectors are likely to encounter. They are the Lockheed 18, the Curtiss-Wright C-46, and the Douglas DC-3. Many of these airplanes have been modified by STCs and been recertified in the transport category. These airplanes may only be operated in passenger-carrying service if they have been recertified in the transport category or if operated in accordance with the performance rules applicable to the transport category. In the latter case, the performance data required to comply with these rules must be approved by the POI and carried in the aircraft during passenger operations. Operators of C-46 aircraft must use part 121 appendix C to comply with the large nontransport performance requirements. This section does not apply to airplanes operating under 14 CFR part 125.

B. Reciprocating-Powered Transport Category Airplanes. By November 1945, CAR 4 was amended by CAR 4a and CAR 4b. Most large reciprocating-powered transport category airplanes that remain in operation, such as the DC-6, were certified under these rules. While subsequent rules contain provisions for the certification of reciprocating-powered transport category airplanes, very few of these airplanes have been certified since CAR 4 has been superseded.

C. Turbine-Powered Transport Category Airplanes. Effective August 27, 1957, Special Civil Air Regulation (SR)-422 was the basis for certification of the first turbine-powered transport airplanes, such as the Boeing 707, the Lockheed Electra, and the Fairchild 27. SR-422A became effective July 2, 1958, and was superseded by SR-422B, effective August 29, 1959. Only a few airplanes were certified under SR-422A, such as the Gulfstream I and the CL-44. The majority of the turbine-powered transport category airplanes now in service, such as the DC-8, DC-9, and B727, were originally certified under SR-422B. SR-422B was recodified with minor changes to 14 CFR part 25, which became effective February 1965.

4-489 DETERMINING APPLICABLE OPERATING RULES. Until the publication of 14 CFR part 119, Special Federal Aviation Regulation (SFAR) 38-2 governs the use of aircraft in air transport operations. Inspectors should use the guidance that follows when determining rules that apply to specific operations.

A. Part 121 Operations. SFAR 38-2 requires that airplanes of more than 7,500 pounds payload or more than 30 passenger seats be operated in air transport service under the provisions of part 121. This requirement applies to both transport and nontransport category aircraft. Transport category airplanes of less capacity may, but are not required to, be operated under part 121.

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B. Part 135 Operations. Airplanes with less than 7,500 pounds payload or more than 30 passenger seating capacity (except transport category airplanes) must be operated in air transport service under the provisions of part 135. Helicopters must be operated under part 135.

C. Congruence of Parts 121 and 135. Since the adoption of SFAR 38-2, large transport and nontransport category airplanes are operated under both parts 121 and 135. Part 121 subpart I and part 135 subpart I have identical aircraft performance provisions.

4-490 SMALL AIRPLANE CERTIFICATION. Title 14 CFR part 1 defines a small airplane as one of not more than 12,500 pounds MTOW. Under CAR 3, Airplane Airworthiness–Normal, Utility, and Acrobatic Categories, and part 23, an airplane could only be certified as a small airplane in the normal category with a MTOW of not more than 12,500 pounds and nine passenger seats. The special conditions (SC) of the Administrator (14 CFR part 21, § 21.16), SFAR 23, and SFAR 41 modified this definition to the extent that airplanes were modified by STC and certified as small airplanes with up to 19 passenger seats. SFAR 41 further modified the definition to the extent that airplanes meeting the requirements of SFAR 41, subparagraph 1(b), and having up to 19,000 pounds MTOW were defined as small airplanes. Part 23, amendment 23-34, established the commuter category and defined airplanes of up to 19,000 pounds certified in that category as small airplanes.

A. Small Transport Category Airplanes. A small transport category airplane is an airplane of 12,500 pounds or less MTOW certified in the transport category. While part 25 permits certification of small airplanes in the transport category, manufacturers have rarely chosen this option. For example, the Cessna Citation 501 and the Learjet 23 are certified in the normal category under part 23. Other models of Citations and Learjets of over 12,500 pounds MTOW (large airplanes as defined in part 1) are certified in the transport category under part 25. Small turbojet airplanes certified in the normal category are operated as small turbine-powered transport category airplanes for the purposes of part 135.

B. Normal Category Airplanes with 10 or More Passenger Seats. Since deregulation, small reciprocating and turbopropeller executive transport airplanes have been stretched and passenger seats have been added. These airplanes were primarily redesigned versions of existing designs. These aircraft were originally certified under part 23 because it was considered impractical to redesign them to part 25 standards. The SCs of the Administrator, SFAR 23, SFAR 41, and part 135 appendix A were additional airworthiness standards developed to allow for the certification of a part 23 airplane with more than 9 passenger seats. All of these rules, except part 135 appendix A, have been superseded. Production of airplanes certified under these rules ended in 1991. Currently, airplanes certified under any of these provisions (except SFAR 41 subparagraph 1(b) airplanes) are limited to an MTOW of 12,500 pounds and must meet the additional performance rules of part 135 appendix A. SFAR 41 subparagraph 1(b) provided for certification of airplanes with up to 19,000 pounds MTOW and 19 passenger seats in the normal category. These airplanes must meet the provisions of part 23 and the additional airworthiness standards specified by the SFAR. They are defined as small airplanes by SFAR 41 subparagraph 1(b) for the purposes of 14 CFR parts 21, 23, 36, 121, 135, and 139. They are defined as large airplanes for the purposes of 14 CFR parts 61 and 91. These airplanes are not required to comply with the provisions of part 135 appendix A, since SFAR 41 subparagraph 1(b) provides additional standards for operations over 12,500 pounds MTOW.

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C. Commuter Category. In January 1987, part 23, amendment 23-34, became effective and established the commuter category. Reciprocating and turbopropeller-powered airplanes with up to 19 passenger seats and 19,000 pounds MTOW may be certified in the commuter category. Commuter category airplanes of over 12,500 pounds MTOW are defined as small airplanes by part 23 for the purposes of parts 21, 23, 36, 121, 135, and 139. They are defined as large airplanes for the purposes of parts 61 and 91.

D. Determining Allowable Takeoff Weight. Depending on the specific rule under which an airplane was certified, the calculations that must be performed to determine allowable takeoff weight can include any of the following:

1) AFM maximum weight limitations (structural):

- Takeoff,
- Zero fuel, and
- Landing.

2) Airport elevation and temperature:

- Departure point,
- Destination, and
- Alternate.

3) Runway limit weight:

- Accelerate-stop distance,
- Accelerate-go (one-engine-inoperative (OEI)), and
- All-engines takeoff distance.

4) Takeoff climb limit weight:

- First segment,
- Second segment, and
- Transition segment (divided into third and fourth segments under some rules).

5) Takeoff obstacle limit weight.

6) En route climb limit and terrain clearance weights:

- All engines operative,
- OEI, and
- Two engines inoperative.

7) Approach climb limit weight.

8) Landing climb limit weight.

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9) Destination landing distance weight.

10) Alternate landing distance weight.

E. Application of Flight Handbook Performance Limits. Many of the requirements of part 121 subpart I and part 135 subpart I apply only until the aircraft takes off from the departure point. Other requirements from these subparts apply at all times, as do the AFM limitations. For example, part 121, § 121.195 and part 135, § 135.385 prohibit a large turbine airplane from takeoff unless, allowing for en route fuel burn, the airplane will be capable of landing on 60 percent of the available runway at the planned destination. The regulations do not, however, prohibit the airplane from landing at the destination when, upon arrival, conditions have changed and more than 60 percent of the runway is required. In this case, the airplane must only be able to land on the effective runway length as shown in the flight manual performance data.

4-491 "V" SPEED DEFINITIONS. Inspectors should be knowledgeable in the terminology and definitions that apply to V speeds. The following definitions apply to speeds used in airplane performance computations.

A. V_{MC}. Defined in part 1 as the minimum speed at which the airplane is directionally controllable with the critical engine inoperative.

1) V_{MCG} is the minimum speed at which the airplane can be demonstrated to be controlled on the ground using only the primary flight controls when the most critical engine is suddenly made inoperative. Throttling an opposite engine is not allowed in this demonstration. Forward pressure from the elevators is allowed to hold the nosewheel on the runway; however, nosewheel steering is not allowed.

2) V_{MCA} is the minimum speed at which directional control can be demonstrated when airborne with the critical engine inoperative. Full opposite rudder and not more than 5 degrees of bank away from the inoperative engine are permitted when establishing this speed. V_{MCA} may not exceed 1.2 V_S.

B. V_{EF}. Defined as the airspeed at which the critical engine is assumed to fail. V_{EF} is selected by the aircraft manufacturer for purposes of certification testing, primarily to establish the range of speed from which V_1 may be selected. V_{EF} may not be less than V_{MCG}.

C. V_{MU}. Defined as minimum unstick speed. V_{MU} is the minimum speed demonstrated for each combination of weight, thrust, and configuration at which a safe takeoff has been demonstrated.

D. V_R. Defined as rotation speed and applicable to transport category airplanes certified under SR-422A and later rules and commuter category airplanes. V_R is determined so that V_2 is reached before the aircraft reaches 35 feet above the runway surface. V_R may not be less than V_{MU} or 1.05 V_{MCA}.

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E. V_1. Defined in part 1 as takeoff decision speed (formerly the critical engine failure speed). V_1 may be selected from a range of speeds. V_1 may be selected as low as V_{EF} but cannot exceed any of the following speeds:

- V_R;
- Refusal speed (the maximum speed the aircraft can be brought to a stop at the selected weight and flap setting on the remaining runway);
- V_{MBE} (brake energy limit speed); or
- Limiting tire speed (if one has been established).

F. V_{LOF}. Defined as the speed at which the aircraft becomes airborne.

G. V_S, V_{SO}, and V_{S1}. V_S is power-off stalling speed or the minimum steady speed at which the aircraft is controllable. V_{SO} is stalling speed in the landing configuration. V_{S1} is the stalling speed or minimum controllable speed in a specified configuration.

H. V_2. Defined as takeoff safety speed. V_2 is used in multiengine transport commuter category and large nontransport category airplanes. V_2 is the speed at which the airplane climbs through the first and second takeoff segments. V_2 must be greater than V_{MU} and 1.1 V_{MCA}. V_2 must also be greater than the following:

- 1.2 V_{S1} for two-engine and three-engine reciprocating and turbopropeller-powered airplanes;
- 1.2 V_{S1} for turbojet airplanes without the capability of significantly reducing the OEI stall speed (no flaps or leading edge devices);
- 1.5 V_{S1} for turbojet airplanes with more than three engines; or
- 1.5 V_{S1} for turbojet airplanes with the capability for significantly reducing the OEI stall speed.

I. V_{REF}. V_{REF} is 1.3 V_{SO}. V_{REF} is the speed used on approach down to 50 feet above the runway when computing landing distances.

NOTE: All V speeds are measured and expressed as calibrated airspeeds, but may be considered as indicated airspeeds for purposes of general discussion.

4-492 RUNWAY LENGTH. The usable runway length may be shorter or longer than the actual runway length due to stopways, clearways, and obstacle clearance planes.

A. Takeoff Runway Length—Nontransport Category Airplanes. The effective takeoff runway length for nontransport category airplanes is defined by obstacle clearance planes. When a 20:1 obstacle clearance plane does not intersect the runway, the effective runway length is defined as the distance from the start of the takeoff roll to the far end of the runway. When the obstacle clearance plane does intersect the runway, the effective runway length is defined as the distance from the start of the takeoff roll to the point at which the obstacle clearance plane intersects the far end of the runway. (See Figure 4-26, Effective Runway Length.)

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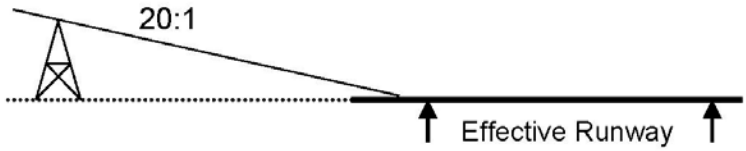
Figure 4-26. Effective Runway Length



B. Transport Category Airplanes. For transport category airplanes the usable runway is not determined by the obstacle clearance plane. An obstacle clearance analysis must be made for each runway. For transport category airplanes certified under SR-422A and subsequent rules, the actual runway length may be extended by clearways and stopways. Clearways and stopways are discussed in paragraph 4-502.

C. Obstructions. An obstruction is a manmade or natural object that must be cleared during takeoff and landing operations. While fixed towers and buildings can be readily identified as possible obstructions, obstruction heights over roadways, railroads, waterways, and other traverse ways are not so apparent. Unless the airport authority or the operator determines with certainty that no movable objects will project into the airspace over the following passageways when an airplane flies over, obstructions are considered to exist on them to the following heights:

- Over interstate highways: 17 feet;
- Over other roadways: 15 feet;
- Over railroads: 25 feet; and
- Over waterways and other traverse ways: the height of the tallest vehicle that is authorized to use the waterway or traverse way.

D. Lineup Distance. Takeoff distance is measured from the position of the main landing gear on the runway to the same point as it passes the runway crossing height (RCH).
The distance required to place the airplane in position for takeoff is not available for the takeoff run. A significant error may be introduced if this distance is not subtracted from the available runway distance when takeoff performance is computed. Large airplanes can use several hundred feet of runway when turning into position on the runway. Also, rolling starts from a taxiway can reduce effective runway by an additional increment because of slow acceleration while takeoff thrust is being set. The allowance may be included in the published data or published as a correction in the AFM. POIs should ensure that operators have appropriate guidance for flightcrews.

4-493 RUNWAY LIMIT WEIGHT—TRANSPORT AND COMMUTER CATEGORIES.
The required takeoff distance is the longest of three takeoff distances: accelerate-stop, accelerate-go, and all-engines. Since the available runway length is a fixed value, allowable

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takeoff weight for any given runway is determined by the most restrictive of the applicable distances.

A. Accelerate-Stop Takeoff Distance. The accelerate-stop distance is the total distance required to perform the following actions:

- Accelerating, with all engines operating at takeoff thrust, from a standing start to V_{EF} speed, at which the critical engine is assumed to fail.
- Making a transition from takeoff thrust to idle thrust, extending the spoilers or other drag devices, and applying wheel brakes (no credit may be taken for reverse thrust).
- Decelerating, and bringing the airplane to a full stop.

B. Accelerate-Go Takeoff Distance. The accelerate-go (with OEI) takeoff distance is the total distance required to perform the following actions:

- Accelerating with all engines operating to V_{EF} speed with recognition of the failure by the flightcrew at V_1.
- Continuing acceleration with OEI to V_R speed, at which time the nose gear is raised off the ground (V_R is V_2 for all airplanes certified prior to SR-422A).
- Climbing to the specified RCH and crossing the RCH at V_2 speed.

C. All-Engines Takeoff Distance. All-engines takeoff distance is the total distance required to accelerate, with all engines at takeoff thrust, to V_R or V_2 speed (appropriate to the airplane type), and to rotate and climb to a specified RCH. For airplanes certified under SR-422A and subsequent regulations, this distance is 1.15 the measured distance.

4-494 TAKEOFF CONDITIONS. Takeoff performance data published in the AFM is based on takeoff results attainable on a smooth (dry or wet*), hard runway with a specified flap setting and a specific weight. The 14 CFR parts do not require that data for compensating takeoff performance for the effects of runways contaminated by frost, ice, snow, slush, or water be published in an AFM. These factors, however, must be accounted for during revenue operations (see paragraph 4-496 for more information on wet or contaminated runways).

NOTE: *Wet runway accountability was included in part 25, amendment 25-92.

A. Airport Elevation. Airport elevation is accounted for in takeoff computations because the true airspeed (groundspeed in no-wind conditions) for a given takeoff increases as air density decreases. As airport elevation increases, the takeoff run required before the airplane reaches V_1, V_{LOF}, and V_2 speeds increases; the stopping distance from V_1 increases; and a greater air distance is traversed from lift-off to the specified RCH because of the increased true airspeed at the indicated V_2 speed.

B. Temperature. As air temperature increases, airplane performance is adversely affected because of a reduction in air density which causes a reduction in attainable takeoff thrust and aerodynamic performance.

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C. Density Altitude. Takeoff performance is usually depicted in an AFM for various elevations and temperatures. The effect of variations in barometric pressure, however, is not usually computed or required by 14 CFR. Some airplanes with specific engine installations, however, must have corrections in allowable weight for lower-than-standard barometric pressure.

D. Weight. Increasing takeoff weight increases the following:

- V_1 of and the ground-run distance required to reach the lift-off point;
- The air distance required to travel from the lift-off point to the specified RCH; and
- The distance required to bring the aircraft to a stop from V_1 speed and the energy absorbed by the brakes during the stop.

E. Flap Selection. Many airplanes have been certified for takeoff with variable flap settings. The effect of selecting more flap (within the allowable range) reduces V_R, V_{LOF}, and the required ground-run distance to reach lift-off. All of these increase the accelerate-stop distance limit weight, the accelerate-go distance limit weight, and the all-engines operating limit weight. The additional flap extension increases aerodynamic drag and also decreases the climb gradient the airplane can maintain past the end of the runway. In the case of a short runway, it may not be possible to take off without the flaps set at the greatest extension allowed for takeoff. In the opposite case, at a high elevation and a high ambient temperature, it may only be possible to climb at the required gradient with the minimum allowable takeoff flap extension.
See Table 4-10, Example of the Effect of Flaps on Required Runway Length and Climb Gradient, for an example of the effect of flaps on required runway length and climb gradient.

Table 4-10. Example of the Effect of Flaps on Required Runway Length and Climb Gradient

Wing Flaps Position	Runway Length Required for Takeoff	One-Engine-Inoperative Climb Gradient
25 degrees	6,350 feet	2.9 percent
15 degrees	7,000 feet	4.5 percent
5 degrees	7,950 feet	5.3 percent
NOTE: This is only an example.		

F. Accounting for Effects. The effect of runway slope on the acceleration, stopping distance, and climbout to the end of RCH must be accounted for. Uphill grades increase the ground run required to reach the points at which V_1, V_R, and V_{LOF} are attained, but they also improve stopping distance. An airplane climbing over an uphill grade runway will require more distance to reach the specified RCH. The reverse is true of downhill grades. Gradient corrections are computed for both runway length and takeoff speeds and the average runway gradient is normally used. The average gradient is determined by dividing the difference in elevation of the two ends of the runway by the runway length. For large variations in runway height (+5 feet), the retarding effect on the uphill segment is proportionally greater than the acceleration gained on

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the downhill portion. In such a case, the slope used for computations should be proportionately greater than the average slope.

4-495 WIND CONDITIONS DURING TAKEOFFS AND LANDINGS. Runway performance computations for both takeoffs and landings must always account for the effect of wind conditions in a conservative manner.

A. Headwinds. Although it is not required, the beneficial effect of a headwind on takeoff and climb distances may be used to compute performance. Only one half of the reported steady-state wind component (parallel to the runway) may be used.

B. Tailwinds. For a downwind takeoff or landing, at least 150 percent of the reported steady-state tailwind component must be used to compute the performance effect. While most airplanes are certified for takeoff with not more than 10 knots of tailwind component, some airplanes have been certified with higher limits. To use these higher limits, the operator must not be limited by the AFM and must be authorized by the operations specifications (OpSpecs).

C. Crosswinds. The maximum gust velocity must be used in the most unfavorable direction for computing the effective crosswind component. Inspectors should be aware of the following guidance.

1) Crosswind values in most AFMs are stated as demonstrated values rather than as limits.

2) While a crosswind may not directly limit an operation from a specific runway, crosswinds and runway conditions affect V_{MCG}. Under some runway conditions, an increase of 1 knot of crosswind component may raise V_{MCG} by as much as 4 knots. Inspectors should be aware that the flight manual may contain different V_{MCG} values for wet and dry conditions and crosswind components.

NOTE: V_1 may not be less than V_{MCG}.

4-496 TAKEOFF FROM A RUNWAY WHICH IS WET OR CONTAMINATED. AFM performance data is based on a dry or wet* runway. When a runway is contaminated by water, snow, or ice, charted AFM performance values will not be obtained. Manufacturers typically provide guidance material to operators so that appropriate corrections for these conditions may be applied to performance calculations. Inspectors should be aware of the following guidance regarding these conditions.

NOTE: *Wet runway accountability was included in part 25, amendment 25-92.

A. Definitions of Wet and Contaminated. A runway is dry when it is neither wet nor contaminated. A runway is wet when it is neither dry nor contaminated. A runway can be considered wet when more than 25 percent of the runway surface area is covered by any visible dampness or water that is ⅛ inch or less in depth. A damp runway that meets this definition is considered wet, regardless of whether or not the surface appears reflective. For the purpose of takeoff performance, a runway is considered contaminated when more than 25 percent of the runway surface area is covered by a reportable contaminant listed in the current edition of

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Advisory Circular (AC) 91-79, Mitigating the Risks of a Runway Overrun Upon Landing, Table 1-1, Operational Runway Condition Assessment Matrix (RCAM) Braking Action Codes and Definitions, "Runway Condition Description" column. Contaminated runway data provided by the aircraft manufacturers usually includes data for wet runway conditions (which is also appropriate for use on runways contaminated by frost and reportable contaminant depths of ⅛ inch or less), as well as data for icy and contaminant depths of ¼ inch or greater as appropriate. The manufacturer may provide additional guidance on selecting the appropriate contaminated takeoff performance data.

NOTE: Wetness is a condition, not a contaminant.

B. Runway Friction. Runway braking friction can change when there is a light drizzle. In some cases, even dew or frost that changes the color of a runway will result in a significant change in runway friction. The wet-to-dry stopping distance ratio on a well-maintained, grooved, well-textured wet runway is usually around 1.15 to 1. On a runway where the grooves are not maintained and the runway has poor texture, polishing, or heavy rubber deposits, the stopping distance ratio could be as high as 1.9 to 1. On ungrooved, well-maintained, well-textured, wet runways, the stopping distance ratio is usually about 2 to 1. In the case of a runway with new pavement, poor texturing, or where rubber deposits are present, the ratio could be as high as 4 to 1. Some newly surfaced asphalt runway surfaces can be extremely slippery when only slightly wet.

C. Takeoff Data Which Accounts for Runway Contamination. Typically the manufacturer makes available takeoff data which accounts for runway contamination such as slush, snow, standing water, and ice. This data is often created using assumptions that were accepted by European certification agencies and are consistent with the recommendations in the current edition of AC 25-31, Takeoff Performance Data for Operations on Contaminated Runways. Usually, this data takes into account an engine failure at the critical point and the performance effect of the contaminant on the following:

1) The first factor is the reduction of runway friction which may increase stopping distance in the case of a rejected takeoff.

2) The second factor is the impingement drag of water or slush on the landing gear or flaps which could cause a retarding force and deceleration force during takeoff.

4-497 TIRE SPEED AND BRAKE LIMITS. Inspectors should be aware that allowable takeoff weight may be limited by either tire speed limits or the ability of the brakes to absorb the heat energy generated during the stop. The energy the brakes must absorb during a stop increases by the square of the speed at which the brakes are applied. Accelerate-stop distances are determined with cold brakes. When the brakes are hot, they may not be able to absorb the energy generated, and the charted AFM stopping distances may not be achieved. The heat generated by the stop may cause the wheels or tires to fail. The peak temperature is usually not reached until 15 to 20 minutes after the stop, which can result in the wheels catching on fire. The wheels of most large airplanes are protected by frangible plugs which melt and allow air to escape from the tires before they explode. Short turnaround times and rejected takeoffs present a potential hazard in terms of heat buildup in tires and in brake assemblies. Most manufacturers publish short

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turnaround charts to provide a minimum cooling period for subsequent takeoffs. POIs should ensure that operators include these charts and procedures in the operator's GOMs or CFMs.

4-498 TAKEOFF CLIMB LIMIT WEIGHT. The climb limit is the weight at which the airplane can climb at a specified minimum climb gradient or specified minimum climb rate in still air through the segments of the takeoff flightpath.

A. Turbine-Powered Transport Category and Commuter Category Airplanes. Climb performance for airplanes in these categories is measured in terms of a gradient (height gained divided by distance traveled, expressed as a percentage) in specified climb segments. The gradients for each group of airplanes are provided in Volume 4, Chapter 3, Section 2.

B. Other Airplanes. All airplanes other than turbine-powered, transport category, and commuter category airplanes must be able to maintain a specified rate of climb throughout the takeoff climb segments. Rates of climb are expressed as multiples of V_S. The required rates of climb for various categories of airplanes are given in Volume 4, Chapter 3, Section 2.

4-499 TAKEOFF WEIGHTS LIMITED BY OBSTACLES. To obtain obstacle clearance throughout the takeoff flightpath, operators of transport category and commuter category airplanes must identify obstacles and limit takeoff weight. Obstacles in the takeoff path that are not cleared horizontally must be cleared vertically by at least the amount specified in the certification rule.

A. Definition of Obstacle. Any object inside the airport boundary which is within a horizontal distance of 200 feet of the flightpath or outside the airport boundary within 300 feet of the flightpath must be considered an obstacle for takeoff computations.

B. Net Flightpath. A net flightpath for takeoff is derived by subtracting a specified percentage from the actual demonstrated climb gradient. This has the effect of adding a progressively larger clearance margin as the airplane travels away from the runway. Specified percentages for airplanes certified under different rules are listed in Volume 4, Chapter 3, Section 2.

C. Conditions for Computing Net Flightpath. The takeoff weight limited by obstacle clearance is computed in a manner similar to the runway takeoff weight limit as follows:

1) One engine is assumed to fail at V_{EF}. The remaining engine(s) are at takeoff thrust.

2) Landing gear retraction is assumed to begin immediately after lift-off. The airplane should climb out at a speed as close as practical to, but not less than, V_2 speed until the selected acceleration height is reached. The acceleration height is chosen by the operator but may not be less than 400 feet.

3) After the airplane reaches the acceleration height, the final segment begins with the transition to en route climb configuration (which is to accelerate to climb speed, retract wing flaps, and reduce to maximum continuous thrust (MCT)). The operator has considerable latitude in choosing the transition method. The operator may choose the flightpath for any runway that

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gives the best results for the particular height and distance of the obstacles. One extreme is to climb directly over the obstacle at V_2, with takeoff flaps and takeoff thrust. The opposite extreme is to level off at the selected acceleration height, accelerate in level flight (negative slope not allowed) to the "flaps up" climb speed, and then to continue climbing and reducing thrust to MCT. An infinite variety of flightpaths between these two extremes may be used. In any event, the flightpath chosen to show obstacle clearance must extend to the end of the takeoff flightpath. The takeoff flightpath ends not lower than 1,000 feet for SR-422 airplanes, and not lower than 1,500 feet for SR-422A, SR-422B, part 25, and commuter category airplanes.

D. Turns. For analysis purposes, it may be assumed that the airplane turns to avoid obstacles, but not before reaching 50 feet above the runway and by not more than a 15-degree bank. When a turn is used, the rate of climb or gradient must be reduced by the increment of climb performance lost.

E. Takeoff Minimums. Terminal Instrument Procedures (TERPS) criteria are based on the assumption that the airplane can climb at 200 feet per nautical mile (NM) (approximately 30:1) to the minimum en route altitude (MEA) through the takeoff flightpath.

1) When obstacles penetrate the obstacle clearance plane, the airplane must be able to climb at a steeper gradient or to use higher-than-standard takeoff minimums to allow the obstructions to be seen and avoided under visual conditions. Authorizations for lower-than-standard takeoff minimums are based on the operator adjusting airplane takeoff weight to avoid obstacles in the takeoff flightpath if an engine fails on takeoff. POIs shall not authorize operators who do not prepare an airport analysis and perform obstacle climb computations to use lower-than-standard takeoff minimums. POIs may approve a system in which the operator makes obstacle clearance computations and performs lower-than-standard visibility takeoffs on specified runways, as opposed to all runways.

2) The criteria for TERPS do not take into account whether or not the aircraft is operating on all engines. Operators must either show compliance with TERPS criteria with an engine out or have an alternate routing available for use in case of an engine failure. Specific guidance for approval of these procedures is in development and will be included in this order at a later date.

4-500 EN ROUTE PERFORMANCE LIMITS. There are a number of en route performance rules that may limit the weight at which an airplane can be dispatched or released.

A. Part 121 En Route Obstacle Clearance. Part 121 subpart I contains en route obstacle limitations for all airplanes operated under part 121. The details of these limitations differ for reciprocating-powered transport category airplanes; turbine-powered transport category airplanes; and large nontransport category airplanes. In general, all airplanes must be operated at a weight at which single-engine failure (two-engine airplanes) or multiple engine failures (three- and four-engine airplanes) can be experienced and the airplane can continue on to the destination or divert to an alternate airport. After the engine failure, the airplane must be capable of clearing all obstructions by a specified margin. Driftdown or fuel dumping may be used to comply with these requirements (see subparagraph 4-500E for a discussion of driftdown).

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B. Part 135 En Route Obstacle Clearance. Section 135.181 places en route performance limitations on all instrument flight rules (IFR) passenger-carrying operations.

1) Section 135.181 allows passenger-carrying flights under IFR conditions in single-engine airplanes and permits over-the-top operations under limited circumstances (refer to § 135.181(c) and (d)(2)).

2) Section 135.181(a)(2) prohibits operating multiengine airplanes in passenger-carrying IFR operations or over-the-top operations unless specific conditions are met. The airplane must be able to sustain a failure of the critical engine and climb at a rate of 50 feet per minute (fpm) at the MEA or 5,000 mean sea level (MSL), whichever is higher. There are also other circumstances in which a multiengine airplane can be operated over-the-top (refer to § 135.181(c) and (d)(1)).

NOTE: Inspectors must be aware that small airplanes of 6,000 pounds or less MTOW are not required to have the capacity to climb or maintain altitude with an engine failed at any altitude for certification.

C. Part 121 Extended Overwater Operations.

1) Extended overwater operations occur when an aircraft other than a helicopter flies more than 50 NM from a shoreline or when a helicopter flies more than 50 NM from a shoreline or an offshore heliport structure. Extended overwater operations do not require specific approval; however, OpSpec B045, which requires the approval of the Flight Technologies and Procedures Division (AFS-400) for issuance, approves these extended overwater operations with a Single Long Range Communication System (SLRCS).

2) Sections 121.183 and 121.193 limit the release of four-engine transport category airplanes. The limitations of these rules vary with the rule under which the aircraft was certified. In general, the airplanes must be dispatched at a weight that will allow the loss of two engines simultaneously at the most critical point of the flight while still allowing the airplane to maintain a specified altitude and reach an alternate airport. The two means by which operators may choose to show compliance are by limiting the takeoff weight or by fuel dumping (see subparagraph 4-500E). Two points on a route that are frequently critical are the point at which the airplane reaches the top of climb and the point at which the airplane is furthest from an alternate airport.

D. Part 135 Overwater Operations. Section 135.183 prohibits operators from operating a land airplane over water (except for takeoff and landing) at a weight at which a positive rate of climb of 50 fpm cannot be maintained at 1,000 feet above the surface. There are no provisions in part 135 for the use of fuel dumping to comply with this requirement. A number of part 135 operators have, however, obtained exemptions to allow the use of fuel dumping (see subparagraph 4-500E).

E. Fuel Dumping and Driftdown. Part 121 operators may use driftdown or fuel dumping procedures to comply with certain en route performance rules. Part 135 operators may apply for a grant of exemption to use driftdown or fuel dumping as an alternate means of

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complying with § 135.181 or § 135.183 in accordance with 14 CFR part 11 (see Volume 4, Chapter 3, Section 2 for information on exemptions).

1) Driftdown can be defined as a procedure by which an airplane with one or more engines inoperative, the remaining engine(s) at MCT, and while maintaining a specified speed (usually best lift over drag (L/D) × 1.01 percent), descends to the altitude at which the airplane can maintain altitude and begin to climb (this altitude is defined as driftdown height).

2) Many modern airplanes can be dispatched or released at takeoff weights that place the driftdown height below the minimum altitude that the airplane is required to maintain by part 121 or 135. In this case, the takeoff weight must be limited or fuel dumping must be used to comply with the en route limit. Compliance must be demonstrated at all points in the en route segment of the flight.

3) Before approving driftdown or fuel dumping procedures for part 121 operators (or part 135 operators who hold exemptions authorizing the use of these procedures), POIs shall carefully evaluate the operator's proposed data, procedures, and training program. The data must either come from the AFM or from the manufacturer. Unapproved data must be reviewed by the applicable Aircraft Evaluation Group (AEG) either in the exemption process or prior to the POI's approval. The CFM must contain specific flightcrew procedures. The operator's training program must provide adequate initial and recurrent training in these procedures. Operators must provide for the POI's evaluation for each route, route segment, or area an analysis of the reliability of wind and weather forecasting, the means and accuracy of navigation, prevailing weather conditions (particularly turbulence), terrain features, air traffic control (ATC) facilities, and the availability of suitable alternate airports. The operator must provide flightcrews with adequate weather briefings.

4-501 APPROACH AND LANDING CLIMB LIMITS. Approach and landing climb limit weights limit the allowable takeoff weight. To compute the maximum allowable takeoff weight, the predicted weight of the airplane after arrival at the intended destination and alternate airports must be computed by subtracting the estimated en route fuel burn. The resulting weight must allow the airplane to climb at a minimum specified gradient (rate of climb) in both the approach and landing configurations.

A. Approach Climb. This requirement is intended to guarantee adequate performance in the go-around configuration after an approach with an inoperative engine (gear up, flaps at the specified approach setting, the critical engine inoperative, and remaining engines at go-around thrust).

B. Landing Climb. This requirement is intended to guarantee adequate performance to arrest the descent and allow a go-around from the final stage of a landing (gear down, landing flaps, and go-around thrust).

4-502 LANDING DISTANCES. The landing distance may refer to either the runway length available for landing or the distance required by the aircraft landing performance calculations.

A. Effective Landing Runway Length. The regulations (§§ 121.171 and 135.361) refer to the "effective length of the runway" for landing, which is the distance from the point on the

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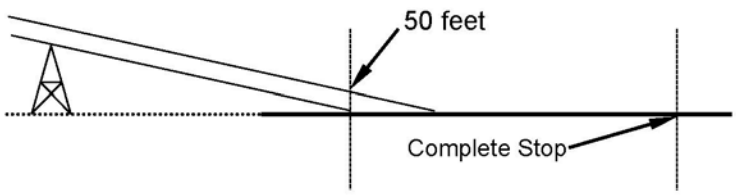
approach end of the runway where the obstruction clearance plane intersects the runway to the far end of the runway. The determination of the effective landing runway length by operators is required only where the Landing Distance Available (LDA) declared distance is not established. Stopways, clearways, and any portion of the runway declared not available and suitable for landing are not included in the effective landing runway length.

NOTE: Refer to Aeronautical Information Manual (AIM) Section 4-3-6, Use of Runways/Declared Distances, for guidance concerning runway declared distances and determination of LDA on runways with and without published declared distances.

B. LDA. The LDA declared distance, where established, is the runway length to be used for landing performance calculations.

C. Required Landing Distance. The required landing distance is established during certification and is the distance needed to completely stop from 50 feet above the runway threshold (i.e., the point at which the obstacle clearance plane intersects the runway (see Figure 4-27, Landing Distance)). In establishing landing performance data, the airplane must approach in a steady glide (or rate of descent) down to 50 feet at speed not less than V_{REF} for the chosen landing flap setting.

Figure 4-27. Landing Distance



D. Factored Landing Distance. The operating regulations (e.g., §§ 121.195, 135.385, and 91.1037) require that the takeoff weight be limited such that the aircraft can land at the intended destination, allowing for normal fuel and oil consumption in flight, within a specified percentage (60 percent for turbojet aircraft) of the effective runway landing length available at the destination airport. The inverse of this percentage (1/.60) is a factor (1.67 in this case) that can be applied to the required landing distance established at aircraft certification to produce the landing runway length required for dispatch. This is referred to as the factored landing distance. The landing distances specified in the AFM may be the required landing distance specified by the certification rules, the factored Landing Distance Required (LDR) by the operating rules, or both.

E. Operational Landing Distance. These distances are advisory performance data (i.e., not required by regulation) which are intended to provide a more accurate assessment of actual landing distance at time of arrival, considering factors which cannot be accurately predicted at time of dispatch, such as runway contaminants, winds, speed additives, and

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touchdown points. These distances may be based upon the use of reverse thrust, ground spoilers, autobrakes, etc.

4-503 LANDING DISTANCE ASSESSMENT AT TIME OF ARRIVAL. There is no specific regulation requiring operators to assess landing distance requirements at time of arrival, but the FAA encourages operators to adopt such procedures to assure a safe landing can be made. Additionally, the FAA highly encourages operators to utilize their FAA-approved landing performance data and any associated manufacturer-provided supplemental/advisory data in concert with the AC 91-79-generated RCAM braking action codes to conduct an adequate landing distance assessment at the time of arrival. This is particularly important when the landing runway is contaminated or not the same runway analyzed for dispatch calculations.
The following are best practices for conducting a landing distance assessment at time of arrival.

A. Timeliness. The assessment is initially performed when landing weather and field conditions are obtained, usually around Top of Descent (TOD). The assessment includes consideration of how much deterioration in field conditions can be tolerated so that a quick decision can be made just prior to landing if the preceding aircraft provides a Pilot Weather Report (PIREP) of worse-than-expected braking action.

B. Source of Data.

1) When possible, the operational landing distance data used is advisory data based on the recommendations of the current edition of AC 25-32, Landing Performance Data for Time-of-Arrival Landing Performance Assessments. This data may be provided by the manufacturer or developed by a performance data provider.

2) For some older airplanes still in service, the manufacturer may not provide advisory data for a time-of-arrival assessment. This is especially true for those manufacturers no longer in business. In this case, the Landing Distance Factors (LDF) from Table 4-11, Landing Distance Factors, may be used. To find the LDR, multiply the AFM (dry, unfactored) landing distance by the applicable LDF in Table 4-11 for the runway conditions existing at the time of arrival. If the AFM landing distances are presented as factored landing distances, then those data must be adjusted to remove the applicable dispatch factors applied to that data. The LDFs given in Table 4-11 include a 15 percent safety margin, and an air distance representative of normal operational practices.

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Table 4-11. Landing Distance Factors

The following factors are multipliers to the unfactored AFM demonstrated landing distances:

Runway Condition Code	6	5	4	3	2	1
Braking Action	Dry	Good	Good to Medium	Medium	Medium to Poor	Poor
Runway Description	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Turbojet, No Reverse	1.67	2.6	2.8	3.2	4.0	5.1
Turbojet, With Reverse	1.67	2.2	2.3	2.5	2.9	3.4
Turboprop Note 2	1.67	2.0	2.2	2.4	2.7	2.9

Note 1: Runway Descriptions may be found in the RCAM for each runway condition code (RwyCC) or Braking Action (refer to AC 91-79).

Note 2: These LDFs apply only to modern turboprops with efficient disking drag. For older turboprops without adequate disking drag use the Turbojet, No Reverse LDFs.

Note 3: The LDFs can apply to any type of anti-skid system (e.g., fully-modulating, quasi-modulating, or on-off system). A description of anti-skid systems can be found in the current edition of AC 25-7, Flight Test Guide for Certification of Transport Category Airplanes. This note applies to the whole table.

C. Runway Condition Considerations. When available for the portion of the runway that will be used for landing, the following are considered:

1) RwyCC.

2) Expected runway conditions (contaminate type and depth).

3) Pilot braking action report.

D. Aircraft Performance Considerations. The following considerations may impact operational landing distance calculations:

1) Runway slope,

2) Airport elevation,

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3) Wind,

4) Temperature,

5) Airplane weight and configuration,

6) Approach speed at threshold,

7) Adjustment to landing distance (such as autoland), and

8) Planned use of airplane ground deceleration devices.

E. Safety Margin. The operational landing distance used for a time-of-arrival landing assessment includes a safety margin of at least 15 percent when based on manual wheel braking.

F. Autobrake Usage. While autobrakes are a part of the aircraft's landing configuration, this landing distance assessment procedure is not intended to force higher than reasonable autobrake selection. For operations when the runway is dry or when the runway is wet, grooved, or Porous Friction Course (PFC) (a relatively thin layer of aggregate sized porous asphalt that allows free penetration of the surface water to the underlying impervious surface course), if the manual braking distance provides a 15 percent safety margin, then the braking technique may include a combination of autobrakes and manual braking even if the selected autobrake landing data does not provide a 15 percent safety margin.

G. Touchdown Point. The touchdown point used in the assessment reflects the assumed air distance. Operational landing data usually includes an allowance for 1,500 feet or 7 seconds of air distance from the threshold to touchdown. An air distance as short as 1,000 feet may be used if an operator's landing assessment procedures include enhancements to minimize the risk of overruns or undershoots, including:

1) Training in touchdown control and short field landing techniques.

2) Identification of required touchdown point and training to assure go-around procedures are initiated, if unable to achieve a suitable touchdown point.

3) Approach guidance and runway markings on the specific runway are consistent with a shorter air distance.

4) Operational data provided to the crew for the specific runway, conditions, and aircraft landing configuration without the need for interpolation.

5) The flight techniques assumed in the creation of the performance data used for a shorter air distance are based on flight techniques to be used in the shorter air distance operation. For example, the assumed speed bleed off used in the performance data needs to be consistent with the trained flight techniques for flaring the aircraft.

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H. Assessment Based on Dispatch Criteria. When the runway is dry, or when the runway is wet and grooved or a PFC, the assessment may be as simple as confirming the runway meets the criteria used for dispatch.

I. Documentation and Training. Published material and training material include the assumptions and limitations on the use of the data provided to do a landing distance assessment at the time of arrival.

RESERVED. Paragraphs 4-504 through 4-520.

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VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 14 GENERAL OPERATING AND FLIGHT RULES—MAINTENANCE ISSUES

Section 9 Safety Assurance System: Monitor Cockpit Voice Recorders

Source Basis:

- **Section 23.1457, Cockpit Voice Recorders.**
- **Section 25.1457, Cockpit Voice Recorders.**
- **Section 27.1457, Cockpit Voice Recorders.**
- **Section 29.1457, Cockpit Voice Recorders.**
- **Section 91.609, Flight Data Recorders and Cockpit Voice Recorders.**
- **Section 121.227, Pressure Cross-Feed Arrangements.**
- **Section 121.359, Cockpit Voice Recorders.**
- **Section 125.227, Cockpit Voice Recorders.**
- **Section 129.24, Cockpit Voice Recorders.**
- **Section 135.151, Cockpit Voice Recorders.**
- **Title 49 United States Code (49 U.S.C.) § 1114, Disclosure, Availability, and Use of Information.**

4-1551 REPORTING SYSTEM.

A. Program Tracking and Reporting Subsystem (PTRS) Activity Codes. For Title 14 of the Code of Federal Regulations (14 CFR) parts 91 and 125 use:

1) Maintenance:

- Ramp Inspection: 3627.
- Spot Inspection: 3628.
- Cockpit En Route Inspection: 3629.

2) Avionics:

- Ramp Inspection: 5627.
- Spot Inspection: 5628.
- Cockpit En Route Inspection: 5629.

B. Safety Assurance System (SAS). For 14 CFR parts 121 and 135, use SAS automation. This section is related to SAS Element 4.6.1 (AW) Avionics Special Emphasis Programs.

4-1552 OBJECTIVE. This section provides guidance in monitoring cockpit voice recorders (CVR) during spot, ramp, and cockpit en route inspections.

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4-1553 GENERAL. Title 14 CFR requires that certain aircraft be equipped with a CVR that meets approved design and installation criteria. The regulations also stipulate that the data obtained from the CVR cannot be used in any civil penalty or certificate action.

NOTE: This does not negate the aviation safety inspector's (ASI) authority and responsibility to monitor the CVR during the performance of airworthiness surveillance functions.

A. Requirements of CVR Maintenance Procedures. The Avionics ASI is responsible for determining that the maintenance procedures ensure that tests are conducted according to procedures provided by the CVR manufacturer and shall include, at a minimum, listening to the recorded signals on each channel to verify that the audio is being recorded properly, is intelligible, and is free from electrical noise or other interference. Any review of recorded audio should be from a timeframe where the aircraft is in operation, or as a minimum, with powerplants operating.

NOTE: Pay particular attention to tape-based CVRs. These devices are at the end of their service life and may not be supported with accurate service documents and parts. Tape-based systems are subject to calendar and hourly life limits not associated with CVRs equipped with non-mechanical recoding media.

B. Monitoring the CVR. There are no restrictions in the regulations that prevent periodic monitoring of the CVR as a method of surveillance.

1) ASIs are cautioned against monitoring CVR data for any purpose other than determining the quality of the recording.

2) Monitoring should be done only to the extent necessary to determine that the quality of reproduction and maintenance of the CVR is adequate.

C. Acoustic Underwater Locating Device (ULD) Maintenance.

1) To ensure the timely activation of ULDs associated with CVRs, Avionics ASIs should evaluate their certificate holder's maintenance and inspection programs to ensure that procedures for testing ULDs are conducted concurrently with battery replacement in accordance with manufacturer's recommendations.

2) Operators' maintenance or inspection programs should also be evaluated to ensure that operational testing is being accomplished, consistent with the CVR or ULD manufacturer's recommended procedures, at specified intervals and, when possible, in conjunction with a numbered or phase inspection (e.g., "A," "B," or "C" check).

3) These requirements must be reflected on work cards or other inspection cards to ensure system-wide compliance.

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4-1554 PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites. Experience with the equipment being inspected.

B. Coordination. This task requires coordination with the operator.

4-1555 REFERENCES, FORMS, AND JOB AIDS.

A. References (current editions).

- Advisory Circular (AC) 20-186, Airworthiness and Operational Approval of Cockpit Voice Recorder Systems;
- Volume 6, Chapter 2, Section 4, Safety Assurance System: Ramp Inspections for Part 91K, 125, 141, 142 Operators and Part 121 and 135 Air Carriers;
- Volume 6, Chapter 2, Section 6, Safety Assurance System: Conduct Spot Inspection of a Program Manager/Operator's Aircraft; and
- Volume 6, Chapter 2, Section 9, Safety Assurance System: Cockpit En Route Inspections.

B. Forms. FAA Form 8430-13, Request for Access to Aircraft.

C. Job Aids. None.

4-1556 PROCEDURES.

A. Initiate the Inspection. See Volume 6, Chapter 2, Sections 4, 6, and 9, as applicable.

B. Monitor the CVR.

1) If this task is being done as part of an en route inspection, obtain permission from the pilot in command (PIC) before plugging into the CVR system.

NOTE: Be aware that not all phone jacks on CVR cockpit monitors are wired for operation.

2) If this task is being done as part of a spot or ramp inspection, accomplish the following:

a) Coordinate with the maintenance supervisor before conducting the inspection.

b) Monitor the in-progress maintenance to ensure that the CVR is being evaluated for performance of its intended function. Check all channels to ensure that the audio is being recorded properly, is intelligible, and is free from electrical noise or other interference.

3) Monitor the cockpit area microphone to ensure that it satisfactorily picks up all cockpit audio.

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NOTE: Be aware that the quality of reproduction of some CVRs can be affected by ground operation of auxiliary power units (APU) and ground power units (GPU).

4) Review the certificate holder's maintenance procedures for acoustic ULDs to ensure that the manufacturer's recommendations are closely followed, including the procedures for the battery check.

C. Analyze Results. See Volume 6, Chapter 2, Sections 4, 6, and 9, as applicable.

4-1557 TASK OUTCOMES.

A. Complete the PTRS Record. For part 125.

B. Follow SAS Guidance Modules 4 and 5. For parts 121/135.

C. Complete the Task. See Volume 6, Chapter 2, Sections 4, 6, and 9, as applicable.

D. Document the Task. File all supporting paperwork in the applicant's office file.

4-1558 FUTURE ACTIVITIES. Follow SAS guidance.

RESERVED. Paragraphs 4-1559 through 4-1575.

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VOLUME 6 SURVEILLANCE

CHAPTER 2 PARTS 121, 135, AND 91 SUBPART K INSPECTIONS

Section 7 Safety Assurance System: Inspect Parts 121 and 135 Aircraft Used for Air Ambulance Operations

6-320 REPORTING SYSTEM(S). Use Safety Assurance System (SAS) automation and the associated Data Collection Tools (DCT).

6-321 OBJECTIVE. This section provides guidance for inspecting Title 14 of the Code of Federal Regulations (14 CFR) parts 121 and 135 aircraft used for air ambulance operations.

6-322 GENERAL.

A. Background. Transportation by aircraft of ill or injured persons may have originated during World War I, when wounded were transported from battlefronts to field hospitals in an open cockpit biplane. Since that time, the transportation of patients needing medical attention has burgeoned into a significant industry, operating modern aircraft equipped with state-of-the-art medical equipment, carrying thousands of patients each year. The introduction of civil aircraft dedicated exclusively to air ambulance operations began around 1973. The majority of today's air ambulance services are affiliated with specific hospitals and, consequently, many are stationed at sub-base-type facilities. There are, however, many private, corporate, and on-demand air carrier operators providing nondedicated aircraft for use. The certificate holders of these aircraft can provide patient care while en route from city to city or from remote sites to urgent care facilities.

B. Aviation Safety Inspector (ASI) Responsibilities.

1) It is important that the ASIs become familiar with the type of aircraft to be inspected before performing the inspection.

NOTE: Although the aircraft may appear clean and sanitary, the ASI should be aware that there may be contaminants aboard. The ASI should exercise good judgment and use caution to prevent the possibility of contracting an infectious disease. When conducting inspections, ASIs should follow the guidance in Federal Aviation Administration (FAA) Order 3900.71, Flight Standards Service Bloodborne Pathogens Program.

2) The ASI must acquire the certificate holder's maintenance procedures and any other items of concern that may surface during routine inspections.

a) In most cases, an ASI who is assigned to the responsible certificate-holding district office (CHDO) will complete the tasks outlined below. As such, this ASI will already have access to the information needed and will be familiar with CHDO personnel.

b) There may be cases when the ASI completing the tasks below is *not* assigned to the responsible CHDO. As a result, this ASI will not have access to the needed information

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nor established lines of communication with CHDO personnel. In such cases, this ASI and the responsible CHDO must ensure clear communication and coordination with each other. The ASI must transmit all inspection results and necessary recommendations to the responsible CHDO. In turn, the CHDO should report to this ASI any changes implemented as a result of their recommendations.

3) This inspection should be performed before the loading or after the unloading of the patient.

NOTE: At all times, the ASI should be aware that the patient may be in a life-threatening condition.

NOTE: ASIs should not approach an aircraft while it is in motion or while the engine(s) is/are running.

4) Any discrepancy should be brought immediately to the attention of the pilot in command (PIC) or appropriate maintenance personnel.

C. Definitions.

1) Air Ambulance Airplane/Helicopter. An aircraft configured for transportation of ambulatory patients or other patients requiring special care, including, but not limited to, basic life support (BLS) or advanced life support (ALS). An air ambulance aircraft is equipped with the medical equipment necessary to support these levels of care in flight with trained medical personnel.

2) Public Aircraft. An aircraft used only in the service of a government or political subdivision. This includes aircraft that are exclusively leased by a government agency for a period not less than 90 days. This definition does not include any government-owned aircraft engaged in carrying persons or property for commercial purposes.

3) Certificate Holder. The person, partnership, company, etc., who has direct responsibility for the operation of the aircraft.

4) Medical Equipment. Equipment and supplies used in patient care.

5) Dedicated Aircraft. Aircraft totally configured to air ambulance operations.

NOTE: Dedicated aircraft may be configured for periodic training. Surveillance should be performed on the aircraft's removed equipment, and the appropriate maintenance records should reflect this change.

6) Nondedicated Aircraft. Aircraft temporarily configured to air ambulance configuration.

7) Scene Flight. Flight to unimproved remote locations, accident sites, or disaster areas for the pickup of patients in life-threatening situations requiring immediate medical care.

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8) Transport Flight. Transport of a stabilized patient to an improved landing area.

9) Neonatal Flight. Transport of an infant, generally using Isolettes (incubator), either in scene flights or transport flights.

10) Pediatric Flight. Transport of young children, either in scene flights or transport flights.

D. Types of Aircraft. Because air ambulance is such a varied field, there are many types of air ambulance aircraft, such as fixed-wing or rotary-wing, single- or multiengine, reciprocating-engine-powered or turbine-engine-powered, instrument flight rules (IFR)-equipped, etc.

1) Typical Aircraft Configuration. Typical air ambulance configurations may include the following items:

a) Medical Oxygen (Gaseous and/or Liquid). Containers, lines, gauges, regulators, outlets, and other system components.

b) Vacuum/Air Systems. Containers, pumps, regulators, lines, gauges, and outlets.

c) Litter Systems. Stretchers, mounting bases, pedestals, platforms, and patient restraining devices, such as shoulder harnesses.

d) Supplemental Lighting. Spots, floods, and emergency.

e) Search Lights (Helicopter Air Ambulances (HAA)). Controlled by the pilot for night operations.

f) Cabin Medical Supply Storage. Bins, compartments, pouches, underseat drawers, nets, and cabinets.

g) Cabin-Mounted Medical Equipment. Intravenous bags, portable oxygen, racks, and brackets.

h) Medical Equipment Power Outlets. Including 12 and 24 volts direct current, 115 volts alternating current, inverters, converters, and batteries. The ASI may find an additional external power receptacle, which is dedicated to alternating current power for the air ambulance equipment.

i) Isolettes/Balloon Pumps. Mounting and securing systems.

j) Specialized Air Ambulance Communication Equipment. Frequency modulation (FM) radios, medical Dopplers, sirens, public address (PA) systems, Intercom Systems (ICS), and communication from aircraft to ground and/or emergency personnel.

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k) Attendant/Medical Personnel Seats. Forward- and aft-facing, side-facing, bench-type and individual, fold-downs, pivoting seats, and reversible seats, lapbelts, and harnesses.

2) Placards. Flight manuals and flight manual supplements. There may be other placards required by the alteration data.

NOTE: Title 14 CFR requires that all equipment installed, including portable devices, must be appropriately secured. The supporting structure to which the equipment is to be attached must be designed to restrain all loads up to the ultimate inertia specified in the emergency provisions/emergency landing conditions required by the regulations.

6-323 COORDINATION REQUIREMENTS. This task may require coordination with the certificate holder and the CHDO.

6-324 REFERENCES, FORMS, AND JOB AIDS.

A. References (current editions):

- Title 14 CFR Parts 1, 21, 23, 25, 27, 29, 39, 43, 65, 121, 135, and 145.
- Title 49 of the Code of Federal Regulations (49 CFR) Part 173.
- Order 3900.71, Flight Standards Service Bloodborne Pathogens Program.
- Advisory Circular (AC) 20-42, Hand Fire Extinguishers for Use in Aircraft.
- AC 21-25, Approval of Modified Seating Systems Initially Approved Under a Technical Standard Order.
- AC 91-42, Hazards of Rotating Propeller and Helicopter Rotor Blades.
- AC 120-27, Aircraft Weight and Balance Control.
- AC 135-5, Maintenance Program Approval for Carry-On Oxygen Equipment for Medical Purposes.
- AC 135-14, Helicopter Air Ambulance Operations.
- AC 135-15, Emergency Medical Service/Airplane (EMS/A).
- Department of Transportation (DOT) HS 806 703, Air Ambulance Guidelines.
- Annual Book of ASTM Standards, Volume 13.01, Medical and Surgical Materials and Devices.

B. Forms. None.

C. Job Aids:

- Figure 6-18, Interior Inspection Guidelines (see Volume 6, Chapter 2, Section 4).
- Figure 6-19, Exterior Inspection Guidelines (see Volume 6, Chapter 2, Section 4).

6-325 PROCEDURES.

A. Initiate the Inspection. Use SAS automation and the associated DCTs to accomplish the inspection.

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B. Prepare for the Inspection.

1) Select an aircraft to be inspected that will be available for the scheduled inspection.

2) Determine if any recent problem areas have been identified for that type of aircraft, such as:

- Emergency Airworthiness Directives (EAD),
- Maintenance and airworthiness bulletins, or
- Out-of-office special requests for problem followup.

3) Determine if recent regulatory changes and Airworthiness Directive (AD) requirements affect the aircraft to be inspected.

C. Introductions. Introduce yourself to the PIC and/or appropriate maintenance personnel. Describe the purpose and scope of the inspection.

NOTE: Perform the inspection before the loading or after the unloading of the patient.

D. Conduct the Exterior Inspection, as Applicable. Perform this inspection in accordance with Volume 6, Chapter 2, Section 4, Figure 6-19. The following items may be found specifically in HAAs:

- External lighting,
- External oxygen storage containers and servicing points, and
- External PA components.

E. Perform Interior Inspection, as Applicable. Perform this inspection in accordance with Volume 6, Chapter 2, Section 4, Figure 6-18, with added emphasis placed on the following items, when applicable:

- Medical oxygen (gaseous and/or liquid),
- Vacuum/air systems,
- Litter systems,
- Supplemental lighting,
- Cabin medical supply storage,
- Cabin-mounted medical equipment,
- Medical equipment power outlets,
- Isolettes (incubators)/balloon pumps,
- Specialized air ambulance communication equipment,
- Attendant/medical personnel seats, and
- Placards.

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NOTE: Do not disturb or rearrange medical equipment or supplies. If such equipment blocks interior areas whose access is necessary to conduct interior inspection, request assistance from the certificate holder's assigned staff.

NOTE: Title 14 CFR requires that all equipment installed, including portable devices, must be appropriately secured. The supporting structure to which the equipment is to be attached must be designed to restrain all loads up to the ultimate inertia specified in the emergency provisions/emergency landing conditions required by the appropriate regulations.

F. Examine the Flight/Maintenance Record Entries.

1) Ensure that all open discrepancies from the previous flight are resolved, per the certificate holder's manual, prior to departure of the aircraft.

2) Review the flight/maintenance records to determine if repetitive maintenance problems exist that might indicate a trend.

3) Ensure that all minimum equipment list (MEL) items are deferred in accordance with the provisions of the certificate holder's approved MEL.

a) Review the certificate holder's approved MEL to determine if the conditions, procedures, and placarding requirements were accomplished to correctly defer specific items.

b) Note the date when the item was first deferred to determine if the maximum allowed length of deferral was exceeded. This can be accomplished by examining the flight maintenance records, deferred maintenance list, deferred maintenance placards, or stickers.

4) Ensure that an airworthiness release, flight/maintenance record entry, or appropriate approval for return to service has been made after the completion of maintenance or reconfiguration of the aircraft.

5) Ensure, when available, that the maintenance records contain, for each discrepancy, the following information per part 43, § 43.9:

- A description (or reference to data acceptable to the Administrator) of the work performed;
- The date of completion of the work performed;
- The name or other positive identification of the person approving the work; and
- The name of the person performing the work, if outside the organization.

6) Ensure that all modifications to the aircraft have been properly documented and accomplished in accordance with approved data, to include a Supplemental Type Certificate (STC), field approval, etc. Ensure that any required flight manual supplements are available to the flightcrew.

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G. Analyze Findings. Analyze each finding to determine if the discrepancies are the result of improper maintenance and/or inadequate maintenance/inspection procedures. Follow SAS guidance for Module 5, Analysis, Assessment, and Action (AAA).

H. Conduct Debriefing. Brief the certificate holder on the inspection results. Discuss all deficiencies, certificate holder corrective actions, and FAA actions. The ASI can find instructions for conducting briefings in Volume 1, Chapter 3, Section 1.

I. Examine the Maintenance Record Entries. Ensure that the certificate holder has recorded all discrepancies noted during this inspection. If time is available, monitor the certificate holder's corrective actions.

6-326 TASK OUTCOMES.

A. Follow SAS Guidance. Follow guidance in Volume 10, Chapter 5, Section 1 for Module 4, Data Collection; and in Volume 10, Chapter 6 for Module 5, AAA.

B. Complete the Task. Successful completion of this task may result in one of the following:

- Satisfactory inspection;
- If the inspection was performed by an office other than the CHDO, the inspection results will be analyzed and assessed in the AAA by the PI at the CHDO to determine if any action is required.
- Compliance and enforcement action. If compliance and enforcement action is required, follow Volume 14, Chapter 1, Section 2.

C. Document the Task. File all supporting paperwork in the certificate holder's office file.

6-327 FUTURE ACTIVITIES. Follow Volume 10 to plan future risk-based surveillance in SAS.

RESERVED. Paragraphs 6-328 through 6-342.

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VOLUME 6 SURVEILLANCE

CHAPTER 2 PARTS 121, 135, AND 91 SUBPART K INSPECTIONS

Section 15 Safety Assurance System: Ground Deicing/Anti-Icing Inspections for Parts 121, 125, and 135

6-508 OBJECTIVE. Title 14 of the Code of Federal Regulations (14 CFR) part 121, § 121.629; part 125, § 125.221; and part 135, § 135.227 state that no pilot may take off in an airplane when frost, ice, or snow is adhering to its wings, control surfaces, engines, or propellers. The primary objective of ground deicing/anti-icing inspections is to determine if the operator has practices and procedures in place that will meet the requirements of the applicable regulations on ground deicing/anti-icing. To fully determine that the operator has such procedures in place and is effectively using these procedures, the aviation safety inspector (ASI) will inspect specific areas of the ground deicing/anti-icing procedures. The areas required to be inspected will depend on the applicable regulations and operations specifications (OpSpecs).

6-509 GENERAL GROUND DEICING/ANTI-ICING INSPECTION PRACTICES AND PROCEDURES. Prior to the beginning of the deicing/anti-icing season, inspectors should become familiar with the parts 121, 125, and 135 operators' ground deicing/anti-icing programs and the airports' ground deicing/anti-icing plans. Volume 3, Chapter 27, Section 1 provides background information on ground deicing/anti-icing and the differences between part 121 and part 135 procedures. Volume 3, Chapter 27, Section 2, contains policy, direction, and guidance on the approval of ground deicing/anti-icing procedures for parts 121 and 135. Inspectors should follow the instructions in that section and familiarize themselves with the rest of the information in these sections prior to the ground deicing/anti-icing season. It is required that inspectors complete the appropriate computer-based instruction (CBI) courses on the electronic Learning Management System (eLMS):

- Course 27019—Ground Deicing/Anti-Icing for Airworthiness Inspectors.
- Course 27020—Ground Deicing/Anti-Icing for Operations Inspectors.

6-510 GROUND DEICING/ANTI-ICING INSPECTION AREAS. The principal inspector (PI) should observe the following general inspection areas to determine an operator's compliance with the ground deicing/anti-icing rules:

- Flightcrew,
- Maintenance and ground personnel,
- Training program,
- Airport deicing/anti-icing plan and secondary deicing/anti-icing areas,
- Equipment, and
- Fluids.

A. Flightcrew. Inspectors should ensure that the flightcrew is familiar with the operator's deicing/anti-icing procedures, has been trained and/or tested in the operator's procedures, and is familiar with the airport ground deicing/anti-icing plan and any remote deicing/anti-icing capabilities. Procedural areas include the following:

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1) Holdover time (HOT) (when appropriate):

- Specific weather conditions,
- Temperature, and
- Type of fluid used.

2) Procedures for communication:

- Deicing/anti-icing start time,
- Documentation,
- Air traffic control (ATC) coordination,
- Current weather information, and
- Verification of deicing/anti-icing.

3) Procedures for pretakeoff check, pretakeoff contamination check, or Outside-the-Aircraft Check (OTAC).

4) Computation of latest takeoff time.

B. Maintenance and Ground Personnel. Inspectors should ensure that the maintenance and ground personnel are familiar with the operator's deicing/anti-icing program and have been trained and/or tested in the operator's procedures. Procedural areas include the following:

1) Knowledge of aircraft manufacturer's ground deicing/anti-icing procedures:

- Knowledge of deicing/anti-icing methods and equipment; and
- Knowledge of pretakeoff check, pretakeoff contamination check, or OTAC.

2) HOT (when appropriate):

- Specific weather conditions,
- Temperature, and
- Type of fluid used.

3) Cockpit communications:

- Type of fluid being used,
- Deicing/anti-icing start time, and
- Confirmation that deicing/anti-icing is complete and the airplane is clean.

C. Operator's Ground Deicing/Anti-Icing Training Program. Inspectors should ensure that the operator has approved training procedures in place that have met the training and/or testing requirements of the applicable regulations. These procedures should ensure that all personnel involved in airplane ground deicing/anti-icing are knowledgeable of their duties and responsibilities.

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1) Inspectors must ensure that the operator has a recordkeeping system in place to verify that all personnel have been properly trained in the operator's procedures. Records should include the following:

- Types of training (including initial and recurrent), and
- Dates of training received.

2) Training for pretakeoff check, pretakeoff contamination check, and/or OTAC.

D. Airport Deicing/Anti-Icing Plan and Secondary Deicing/Anti-Icing Areas.

1) If an airport deicing/anti-icing plan has been developed, then the inspectors should have a general knowledge of this plan and any secondary deicing/anti-icing areas.

2) Inspectors should be familiar with an airport's deicing/anti-icing control center. Many airports have developed command centers that control the movement of aircraft, the allocation of slot times, the location of remote deicing/anti-icing, and runway snow removal. The inspector should become familiar with the planned procedures prior to the deicing/anti-icing season.

E. Equipment. Inspectors should have a general level of knowledge of the deicing/anti-icing equipment.

F. Fluids. Inspectors should be familiar with the types of fluids used for deicing/anti-icing.

1) Type I applications:

- Performance characteristics,
- Mix ratio, and
- Temperature.

2) Types II and IV applications:

- Performance characteristics,
- Mix ratio,
- Temperature, and
- Airplane rotation speed.

3) Storage requirements.

6-511 SPECIFIC GROUND DEICING/ANTI-ICING INSPECTION PRACTICES AND PROCEDURES.

A. Operator Procedures. Surveillance of the operator's procedures should clearly show the 14 CFR part that is being used to meet the ground deicing/anti-icing rule. Recall that an operator may have several options under part 121, 125, or 135, as applicable, to meet the requirements of the rule. These options are discussed in Volume 3, Chapter 27, Sections 1 and 2.

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1) Crewmember training must meet the requirements of the rule and the approval process discussed in Volume 3, Chapter 27, Section 2.

2) Crewmember training should include at least the following information:

- The use of HOTs and tables when using deicing/anti-icing fluids (These HOTs are only advisory in part 135 operations and will only guide the pilot as to what contamination to expect when conducting the pretakeoff contamination check);
- Airplane deicing/anti-icing procedures; inspection and check procedures, to include responsibilities and requirements for the pretakeoff contamination check, the OTAC, or the alternative procedures as applicable;
- Communications with all personnel or agencies involved in the deicing/anti-icing process and the decisionmaking process;
- Airplane surface contamination, to include adherence of frost, ice, or snow and critical area location and identification; knowledge of how small amounts of surface contamination adversely affects airplane performance and flight characteristics; and
- Types and characteristics of deicing/anti-icing fluids, if fluids are used by the certificate holder.

a) It is important that flightcrews do not use deicing/anti-icing fluids unless they have been trained in the characteristics and effects of these fluids on their operation:

- Cold weather preflight inspection procedures; and
- Techniques for recognizing contamination on the airplane (this aspect of training should cover both preflight inspection and pretakeoff contamination check).

b) All training should be airplane-specific. When an operator has different kinds of airplanes, the training should cover any unique characteristics of these airplanes while operating in ground icing conditions.

B. Reporting System(s).

1) Safety Assurance System (SAS). For parts 121 and 135, use SAS automation and the associated Data Collection Tools (DCT).

2) Program Tracking and Reporting Subsystem (PTRS). Use the PTRS for part 125 only. Several examples of the correct entries to use on the PTRS Data Sheet are included in CBI Training Course 27020.

a) Correct PTRS entries for deicing/anti-icing surveillance are as follows: Operations 1637, Maintenance 3625, Avionics 5625.

b) All deicing/anti-icing surveillance activities require that the word “ICE” be written in the “National Use” block. This is especially important in a surveillance situation when

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an inspector is conducting a separate activity and observes deicing/anti-icing during that surveillance. For further guidance regarding PTRS, see Figure 6-27, Guide for Completing PTRS Data Entry.

Figure 6-27. Guide for Completing PTRS Data Entry

SECTION I

(REF. FAA FORM 8000-36)

1. INSPECTOR NAME CODE: Enter the identification CODE of the inspector performing the surveillance as it appears in the Aviation Safety Analysis System (ASAS) inspector ID tables. If the surveillance activity was performed as a team effort on the same individual air carrier and the same piece of equipment identified in the DESIGNATOR field below, enter the identification code of the team leader, and provide the names of the team members in SECTION II—PERSONNEL of this report.

2. ACTIVITY NUMBER: Enter the PTRS ACTIVITY CODE for SURV/OPER/DEICE, Operations 1637, Maintenance 3625, Avionics 5625, as applicable, to the individual identified in the INSPECTOR NAME CODE field above. If deicing/anti-icing of more than one aircraft make or model was observed during this surveillance, enter a separate activity code for each model of aircraft on which deicing/anti-icing surveillance was conducted.

3. FAR [14 CFR Part]: Enter 125.

4. STATUS (POC): Enter the LETTER, as applicable.

5. RESULTS (ACEFISTX): Enter the LETTER, as applicable.

6. CLOSED DATE: Enter the DATE when the surveillance was completed.

7. DESIGNATOR: Enter the DESIGNATOR code of the operator, as assigned by the Regulatory Support Division (AFS-600), for which the report is made.

8. LOC/DEPARTURE POINT: Enter the airport 3-letter identifier.

9. MAKE—MODEL—SERIES: If a ground deicing/anti-icing activity was observed on an aircraft, enter the make, model, and series (M/M/S) of that aircraft. Otherwise, leave this field blank.

10. TRACKING: Enter the TIME OF DAY that the deicing/anti-icing surveillance was conducted.

11. NATIONAL USE: Enter “ICE.”

12. ACTIVITY TIME: Record the cumulative TIME spent on this activity. If this surveillance activity was completed in conjunction with another activity, such as cockpit en route or ramp inspection, do not record any activity time in this field.

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SECTION II—PERSONNEL

13. PERSONNEL NAME: Enter the names of the surveillance team members, if appropriate.

14. POSITION: Enter the specialty of the team members identified in the PERSONNEL NAME field above (Operations, Airworthiness, or Avionics, as appropriate).

SECTION IV—COMMENTS

15. PRIMARY AREA/KEY WORD: Enter the CODES listed below to standardize the entries in the COMMENT TEXT field. However, additional PRIMARY AREA/KEY WORD codes may be used, as necessary, to address additional comments.

16. D/757: Enter the meteorological conditions that existed at the time the deicing/anti-icing surveillance was conducted. This entry should include the outside air temperature (OAT) and precipitation.

RESERVED. Paragraphs 6-512 through 6-526.

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