

Aging Airplane Safety Rule

&

New Part 26 DAH Rule

“Damage Tolerance Data for Repairs and Alterations”

Presented to: Structural Task Group

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Federal Aviation
Administration



Agenda



- Issuance of Aging Airplane Safety Rule (AASR), New Part 26 DAH Rule, and AC 120-93
- FAA Training & Familiarization Briefings
- FAA current activities
- Background on AASR
- AASR Damage Tolerance (DT) Requirements
 - **Overview of Operator Requirements**
- Part 26 DAH Rule Requirements
 - **TC & STC Holder Tasks and Deliverables**

Issuance of the AASR, Part 26 Rule, and AC 120-93

- **The final AASR was issued on Feb. 2, 2005**
 - Changes to rule text for repairs & alterations issued on 12/12/07.
 - Compliance date for DT inspection program is Dec. 20, 2010
- **The final Part 26 DAH rule was issued on Dec. 12, 2007.**
 - The effective date of the rule is Jan. 11, 2008.
 - Compliance dates for DT data addressing existing repairs are 6/30/2009 & 12/30/2009.
- **AC 120-93 “DT Inspections for Repairs and Alterations” was issued on Dec. 13, 2007.**
 - Supports TC and STC holder compliance with the DAH rule, and
 - Operator compliance with the AASR





FAA Training & Familiarization Briefings

- Three day training (*IVT*) given to all FAA Aircraft Certification Offices (ACOs)
- Familiarization Briefings given to TC and STC holders. Briefings have been conducted at:
 - **TCCA, EASA, ANAC**
 - **All FAA ACOs**
- Training will be given in Oct. 2008 to FAA Flight Standards Division
 - **Will support implementation of AASR**



Current FAA Activities

- Weekly conference calls with TCCA, EASA, and ANAC:
 - **Objective, harmonized implementation of Part 26 DAH rule**
- Weekly conference calls with all FAA ACO's
 - **Objective, harmonized implementation of Part 26 DAH rule**
 - **Discuss/address implementation issues, provide guidance**
- Implementation Tracking System being populated
 - **Provides status of TC/STC holder compliance**
 - **Each required deliverable is being tracked**
 - **FAA review/approval status is also tracked**



Current FAA Activities *-continued*

- FAA PMIs collecting list of STC alterations from operators. List will be:
 - **Used to identify STC's missed on initial list**
 - **Provided to ATA for placement on public website to**
 - **Provide status of STC**
 - **Identify STC holder if available**
 - **Identify Operators that have STC**
- FAA ACO's coordinating with TC & STC holders in development of compliance plans.
- FAA supporting TC holder STG meetings, as necessary.

Aging Airplane Safety Rule

&

Part 26 DAH Rule



Goal of AASR DT Requirements

**Prevent Catastrophic
Failure due to fatigue
Cracking**

Goal is based on –

- Recommendations made by Industry/government committee following Aloha accident



Objective of Part 26 DAH Rule

The objective of the DAH rule is to support operator compliance with the damage tolerance requirements of the AASR, with respect to repairs and alterations.



Background on the Aging Airplane Safety Rule

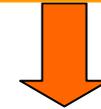


Aloha Accident



Highlighted aged-related problems with airframe structural fatigue and issues regarding maintenance, inspection, and repairs

ALOHA Accident, 1988



Congress: 1991 AASA



AASR: 2005

Aging Aircraft Safety Act of 1991

Congressional Mandate:

1991 Aging Aircraft Safety Act

The Act required FAA to promulgate a rule to assure the continuing airworthiness of aging aircraft.

- Requires FAA to conduct airplane inspections and records review*
- A Rule to Require operators to demonstrate their maintenance program is adequate/timely enough to assure highest level of safety for age sensitive parts and components.*

ALOHA Accident, 1988



Congress: 1991 AASA



AASR: 2005

Aging Airplane Safety Rule

In response to the Act,

FAA issued the Aging Airplane Safety Rule to require:

- Airplane inspections and records review
(121.1105, 129.105, 135.422)
- Damage tolerance-based inspections
(121.1109 & 129.109)

ALOHA Accident, 1988



Congress: 1991 AASA



AASR: 2005



***Part 26 DAH Rule
Dec. 2007***

ALOHA Accident, 1988

AATF / AAWG
1988 1991

**FAA Aging
A/P Program**

Congress: 1991 AASA

AASR, 1993 NPRM

AASR, 1998 New NPRM

AASIFR, 2002

AASFR, 2005

DAH NPRM, 2006

**DAH Final Rule
Dec. 12, 2007**

1. **Mandatory Mod**
2. **Structural Maintenance Program Guidelines**
3. **CPCP**
4. **Updated SSIDs**
(AD's: 1990's-2007)
5. **Repair Assessment Program**
*(§ 121.370: late 1990's
now § 121.1107)*

Overview of AASR Damage Tolerance requirements



Applicability of AASR DT Reqmts

§§ 121.1109 & 129.109

Applies to Part 121 & 129 (*U.S. Registered*) **Operators** of transport category, turbine powered airplane models that have —

- (1) A maximum type certificated passenger seating capacity of 30 or more; or
- (2) A maximum payload capacity of 7,500 pounds or more.

Note, airplane models with a type certificate issued prior to January 1, 1958 are not affected.

AASR DT Requirements For Baseline Structure

§§ 121.1109 & 129.109 (*U.S. registered*)

(c) General requirements. After December 20, 2010, a certificate holder may not operate an airplane under this part unless the following requirements have been met:

(1) Baseline Structure.

The certificate holder's maintenance program for the airplane includes FAA-approved **damage-tolerance-based inspections and procedures** for airplane structure susceptible to fatigue cracking that could contribute to a catastrophic failure. For the purpose of this section, this structure is termed "**fatigue critical structure.**"



AASR DT requirements for Repairs and Alterations (**subject of DAH Rule**)

§§ 121.1109 & 129.109 (*U.S. registered*)

(c)(2) Adverse effects of repairs, alterations, and modifications.

The maintenance program for the airplane includes a **“means”** for addressing the adverse effects repairs, alterations, and modifications may have on fatigue critical structure and on inspections required by paragraph (c)(1) of this section. The means for addressing these adverse effects must be approved by the FAA Oversight Office.

AASR and DAH Rule Relationship

1. Require operators to incorporate into their maintenance programs a **“means”** for addressing the adverse effects of repairs and alterations.

AASR

§ 121.1109(c)(2)

§ 129.109(c)(2)

2. Require TC and STC holders to develop DT data required to support an operator’s **“means”** for addressing repairs and alterations.

DAH Rule

§§ 26.43, 26.45, 26.47

Operator Requirements

Baseline structure:

- Operators are required to incorporate into their maintenance program an FAA approved DT based inspection program. Compliance date is December 20, 2010
 - DT data developed for compliance with type certification requirements (ref. § 25.571) are an acceptable means of compliance with section 121.1109(c)(1) of AASR.
 - A SSID mandated by AD for pre-amdt 25-45 airplane model is an acceptable means of compliance with section 121.1109(c)(1).
 - All pre-amdt 45 airplanes subject to 121.1109 will have a mandated SSID by June 2009.

No additional DT data should be required to support compliance with 121.1109(c)(1)-Baseline Structure. Operators will need to coordinate this with its PMI for compliance.

Operator Requirements *-continued*

- **Repairs & Alterations:**

- By December 20, 2010, operators must incorporate into their airplanes maintenance program, a **“means”** for addressing the adverse effects that repairs and alterations may have on fatigue critical structure.
- AC 120-93 provides guidance material for developing and incorporating a “means”.
- Chapter 4 of AC 120-93 recommends the operator develop an **Operator Implementation Plan (OIP)**.
 - The **OIP** will contain the **“means”**, that is, the information necessary to establish the basis for compliance with 121.1109(c)(2).
 - The data developed by TC and STC holders for compliance with the Part 26 rules, will be used by the operator to support development of its **OIP**.
 - Approval of the **OIP** will constitute compliance with 121.1109(c)(2)

Developing an Operator implementation Plan (OIP)

Section 401 of AC 120-93

- **Operators must first determine what data will be made available to them by TC and STC holders**
 - Attend/support TC holder STG meetings
 - Identify STCs installed on airplane fleet, and contact STCH to coordinate means to procure data.
 - Where STC's have been surrendered, or STCH is no longer in business, operator will be responsible for obtaining DT data.
 - For non-TC/STC alterations (e.g., field approvals), operator will identify these during repair survey, and will be responsible for obtaining DT data.

Developing an OIP *-continued*

Section 401 of AC 120-93

- **The OIP should include processes and procedures to ensure that all new and existing repairs and alterations affecting FCBS are evaluated for damage tolerance and have implemented DT inspections (DTI).**
- **Operators should use information contained in TC and STC Holder Compliance Documents (ref. chapters 2/3 of AC 120-93) to support development of OIP.**
 - Compliance documents will include processes, timelines, lists of FCS, reference to DT data, airplane design service goals, or other data necessary to support compliance with 121.1109(c)(2).
 - Additional processes not identified in AC 120-93 may be required by PMI. Such processes will be addressed in training that will be given to PMI's in Oct. 2008.

Contents of OIP

Section 402 of AC 120-93

The OIP should contain the following processes:

- A process for incorporating list of FCBS and FCAS into maintenance program (how will future FCAS be incorporated?)
- A process describing how list of FCBS/FCAS will be used to determine if a DTE for repair or alteration is required (who will be making determination).
- A process that implements the elements of the Repair Evaluation Guidelines (REGs) obtained from the TCH
 - **Repair survey process**
 - **Process to obtain DT data for existing repairs**
 - **Implementation schedule**
- A process to determine if DT inspections (DTI) exist for repairs and alterations identified in the airplane survey.
- A process for identifying and listing alterations that affect FCBS.

Contents of OIP *-continued*

Section 402 of AC 120-93

The OIP should contain the following processes:

- A process for obtaining DT data for alterations identified in survey.
- A process for obtaining DT data for STC alterations where STC has been surrendered or STCH is no longer in business.
- A process for ensuring DT data is obtained for new repairs & alterations
- A process describing how DTIs for repairs and alterations will be incorporated into the operator's maintenance program, and for showing where the DTIs exist within the operator's maintenance program.
- A means of ensuring that the airplane will not be operated past the time limit established for obtaining DTIs.

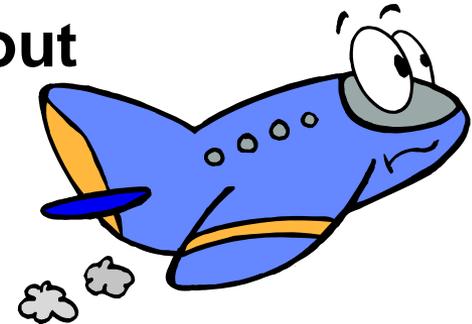
See Chapter 4 of AC 120-93 for further information

New Part 26 DAH Rule



Why New DAH Approach?

- **Two approaches for addressing safety issues:**
 - Airworthiness Directives
 - General rulemaking
- **Operators have expressed concerns about the timely availability of data to support compliance with operational rules**
- **Voluntary Support Problems**
- **As a result, the FAA has determined that Design Approval Holder (DAH) requirements will be adopted as necessary to support certain future safety initiatives which will be implemented via operational rules**





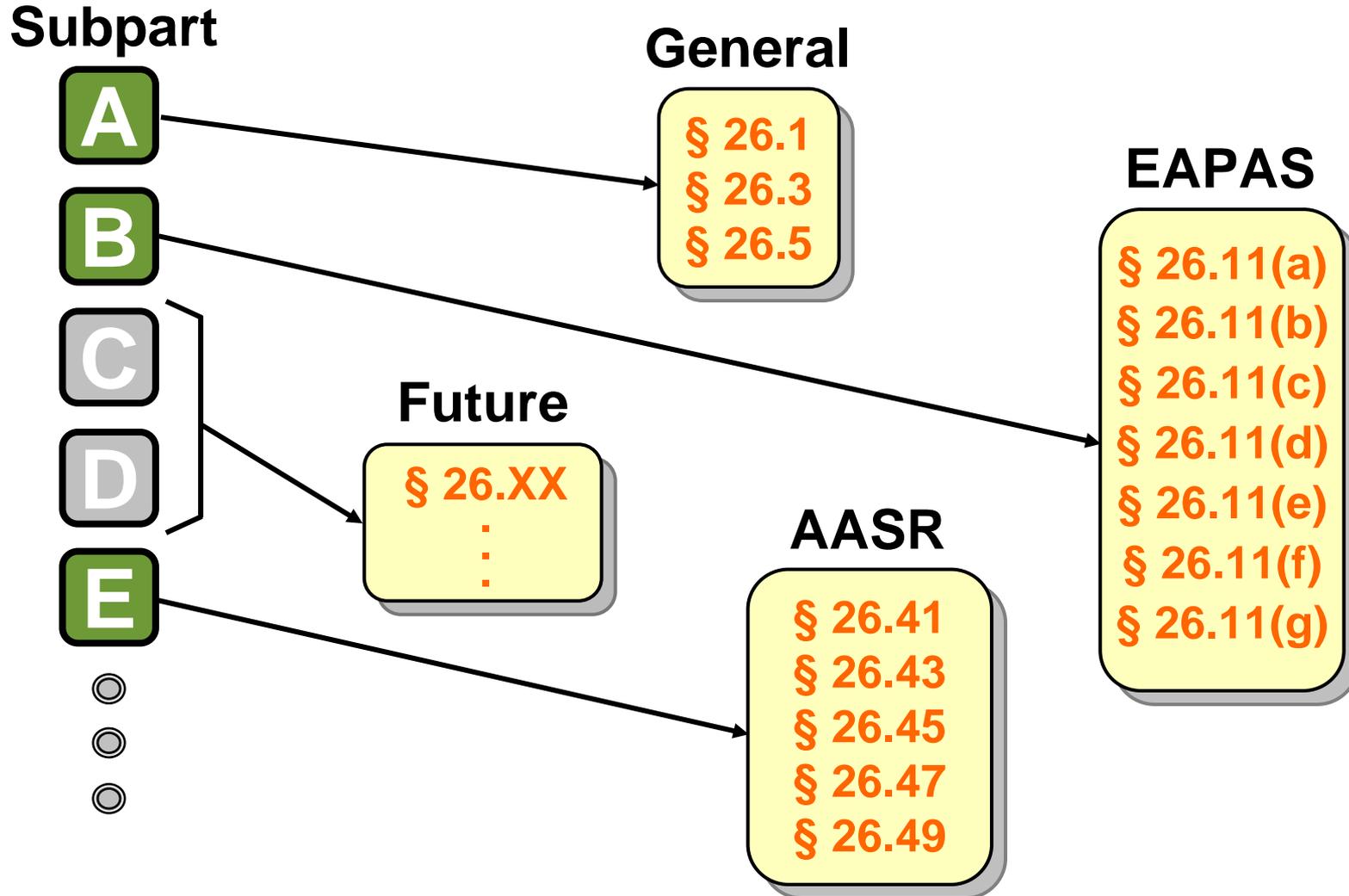
Typical Rulemaking Component with New DAH Concept

- **Certification rules** (e.g., § 25.571)
- **Operational rules**
(Parts 91, 121, 125, 129, etc.)
- **DAH rules (Part 26)**



“NEW” Part 26

Continued Airworthiness and Safety Improvements for Transport Category Airplanes



Current DAH Rulemaking Initiatives

- **Enhanced Airworthiness Program for Airplane Systems/Fuel Tank Safety (EAPAS)**
 - In part, it requires DAH to develop Electrical Wiring Interconnection System (EWIS) Instructions for Continued Airworthiness (ICA)
- **Aging Airplane Safety Rule (AASR)**
 - Requires DAH to develop damage tolerant inspection instructions for continued airworthiness
- **Fuel Tank Flammability (FRM)- *in NPRM stage***
 - Requires DAH to develop flammability exposure analyses of fuel tank. High risk fuel tanks require new design and ICA.
- **Widespread Fatigue Damage (WFD)-*in NPRM stage***
 - Requires DAH to establish a Limit of Validity of the engineering data that supports the maintenance program.

AASR: New Part 26 DAH Rule

Supports operator compliance with the Aging Airplane Safety Rule (AASR)

ALOHA Accident, 1988



Congress: 1991 AASA



AASR: 2005



DAH Final Rule: 2007



Applicability of DAH Rule

§§ 26.43, 26.45, 26.47, 26.49

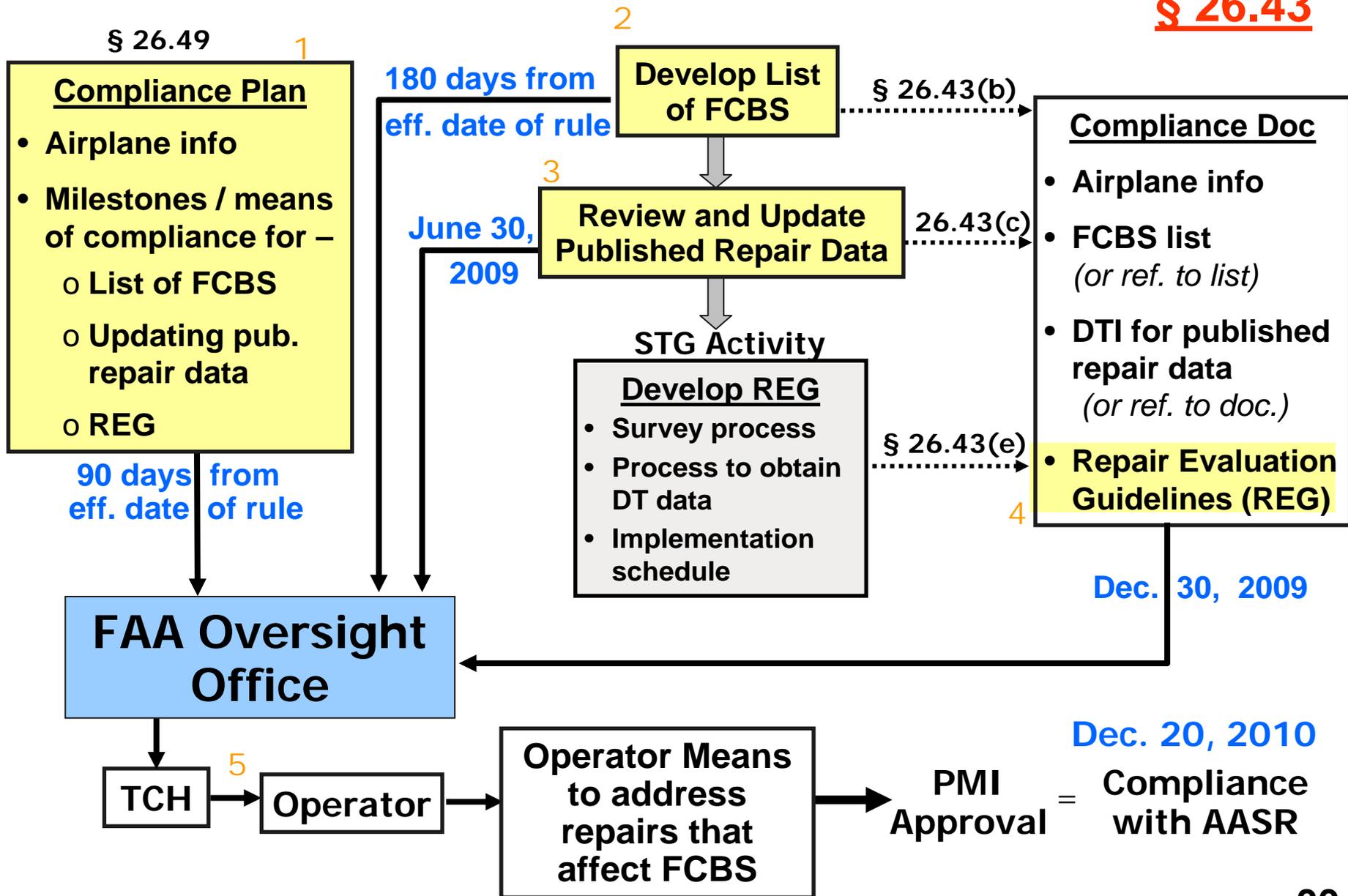
Applies to TC and STC holders that hold a TC for, or STC applicable to, a transport category, turbine powered airplane model that have —

- (1) A maximum type certificated passenger seating capacity of 30 or more; or
- (2) A maximum payload capacity of 7,500 pounds or more.

Note, airplane models with a type certificate issued prior to January 1, 1958 are not affected.

TC Holder Tasks & Deliverables For Existing Repairs

§ 26.43



Part 26 DAH Rule Sections

14 CFR	Topic
§ 26.43	TC holders: repairs
§ 26.45	TC holders: alterations & repairs to alterations
§ 26.47	STC holders: alterations & repairs to alterations
§ 26.49	Compliance plan from TC & STC holders for §§ 26.43, 26.45, 26.47

Compliance Plan Submittal Dates



Rule	Compliance Plan	Compliance Date
§ 26.49 (b)(1)	Compliance plan For TCH Repairs, § 26.43	90 days after eff. date of the rule
§ 26.49 (b)(1)	Compliance plan For TCH Alterations § 26.45	90 days after eff. date of the rule
§ 26.49 (b)(2)	Compliance plan For STCH Alterations § 26.47	180 days after eff. date of the rule
No Compliance Plan required for applications submitted after eff. date of DAH rule (<i>part of normal cert. plan</i>)		

Part 26 DAH Rule Sections

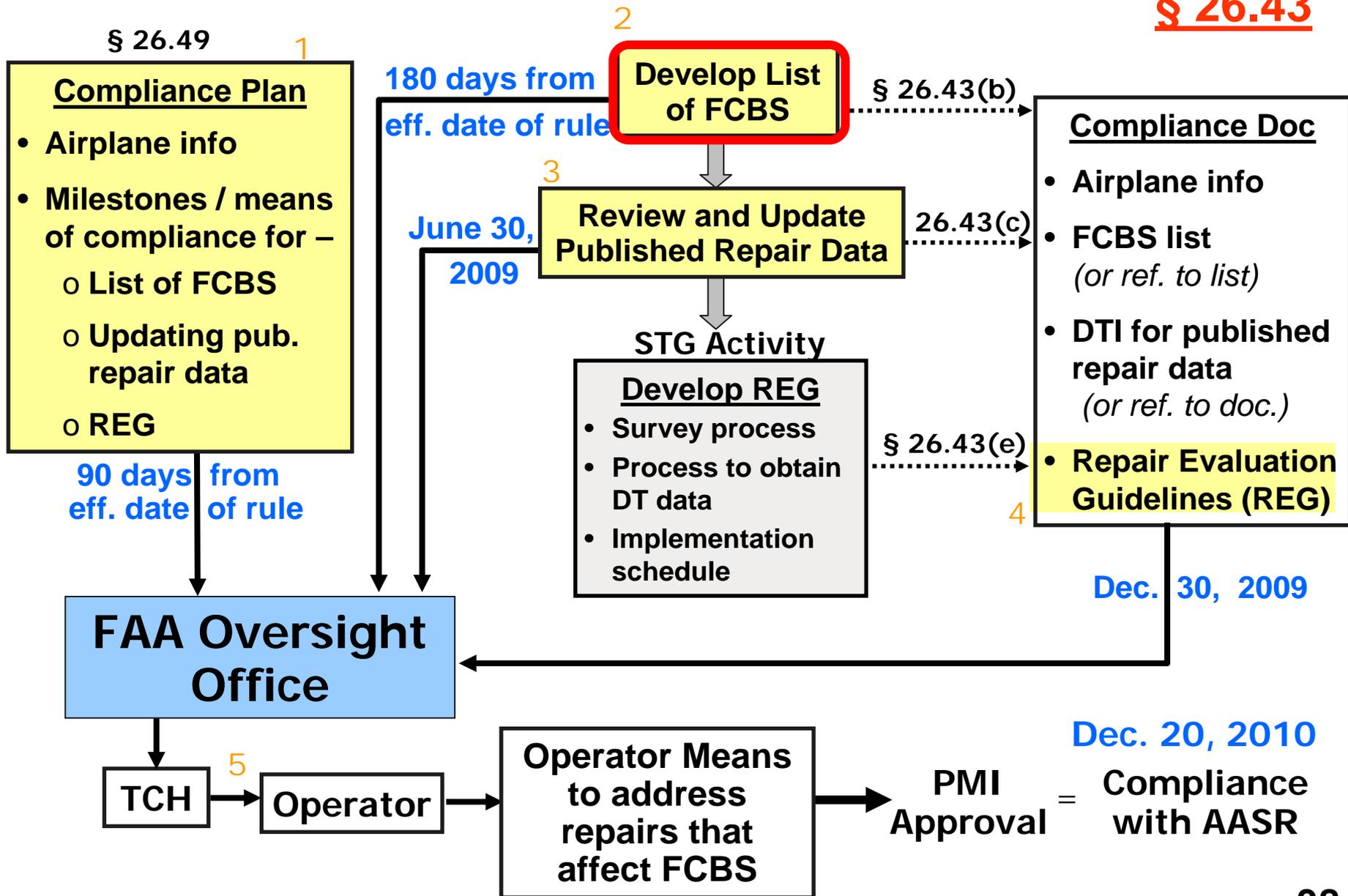
14 CFR	Topic
§ 26.43	TC holders: repairs
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§ 26.49	Compliance plan from TC & STC holders for §§ 26.43, 26.45, 26.47

Data Submittal & Compliance Dates– TC Holder, Repairs § 26.43

Rule	Data Submittal	Compliance Date
§ 26.43(c)	List of Fatigue Critical Baseline Structure (FCBS)	180 days after eff. date of the rule
§ 26.43(b)	Updated Published Repair Data	June 30, 2009
§ 26.43(f)	Repair Evaluation Guidelines (REG)	December 30, 2009

TC Holder Tasks & Deliverables For Existing Repairs

§ 26.43



List of Fatigue Critical Baseline Structure – TC Holder, Repairs

Section 26.43(b) requires TC holder to develop and make available a list of FCBS for each of their applicable airplane models

- Operators will need this list to identify repairs that affect FCBS
- STC holders will need this list to identify all FCBS that is affected by their alteration

Fatigue Critical Structure

“Structure that is susceptible to fatigue cracking that could contribute to a catastrophic failure”

- Fatigue critical baseline structure (FCBS)
- Fatigue critical alteration structure (FCAS)

Fatigue Critical Baseline Structure

Section 204 of AC 120-93

The intent of the AASR is to address the same structure that is required to be evaluated for compliance with § 25.571 (amendment 25-45 or later).

Rule Text From Section 25.571

- “This evaluation must be conducted ... for each part of the structure which could contribute to a catastrophic failure.”
- “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue ... will be avoided throughout the operational life of the airplane.”

Fatigue Critical Structure

In the AASR, the term PSE was not used due to the varying definitions for PSE that are applied among TC holders.
(explanation in AC 120-93)

However, applying the definition for PSE that is in AC 25.571 would be acceptable for identifying fatigue critical structure. This would be an extensive list and would typically be used to determine if an alteration affects FCBS.

Criteria may applied to this extensive list for structure where stress levels are low (not susceptible to fatigue cracking), and where repairs of SRM quality will not affect the fatigue loading of this structure. In these cases, the baseline zonal inspections may be determined adequate, that is, no DTE required. (SRM quality repair would need to be defined). This criteria would serve to reduce the number of repairs requiring a DTE.

§ 26.43: TC Holders – Repairs

14 CFR	Required Data Submittal
§ 26.43(b)	List of Fatigue Critical Baseline Structure (FCBS)
§ 26.43(c)	Updated Published Repair Data
§ 26.43(e)	Repair Evaluation Guidelines

Review Of Published Repair Data

Section 206 of AC 120-93

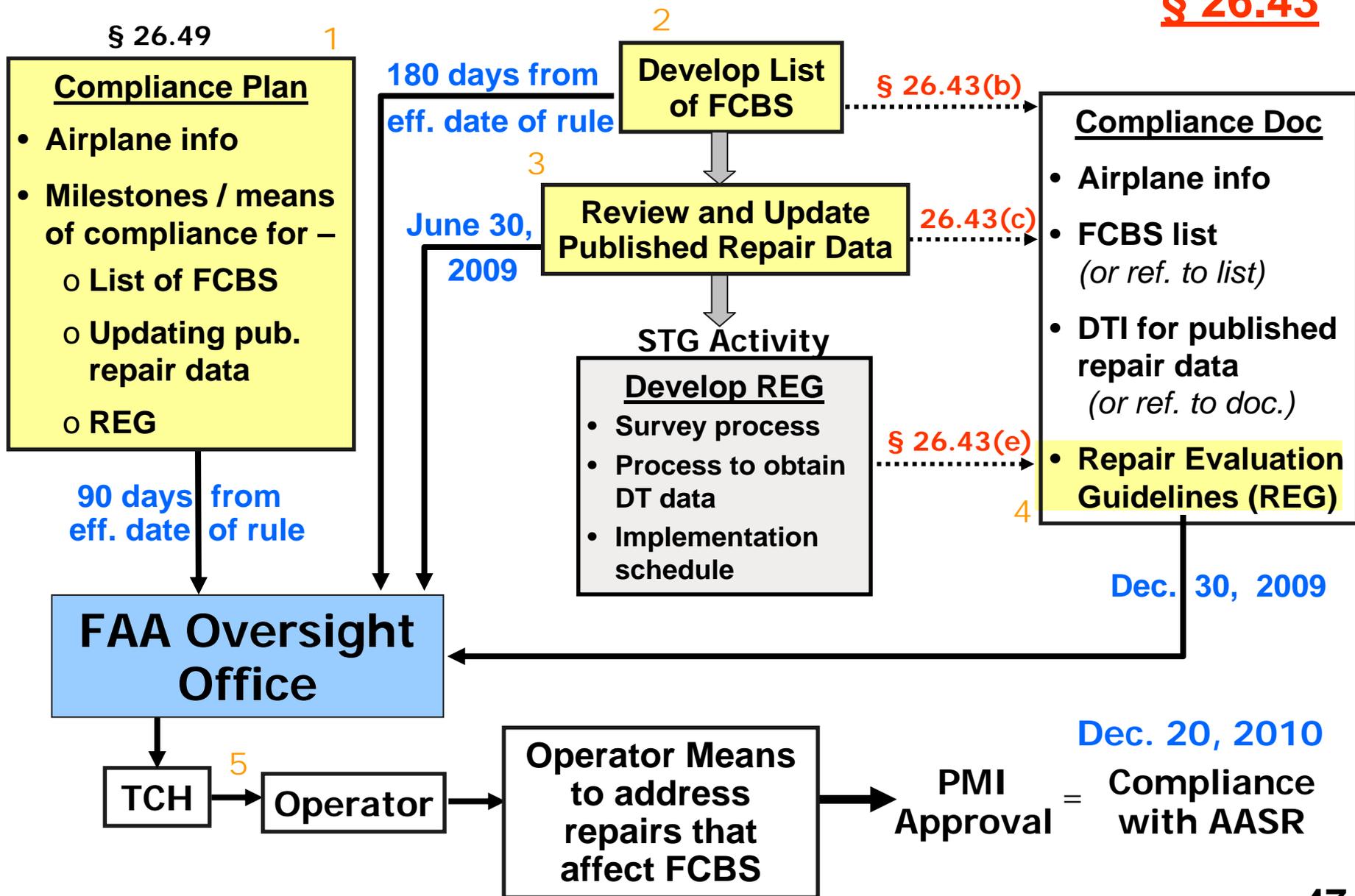
- **Section 26.43(c) requires TC holders to review their published repair data and update it for damage tolerance as determined necessary.**
- **Published repair data may include:**
 - Structural Repair Manuals (SRMs)
 - Service Bulletins (SBs)
 - Airworthiness Directives (ADs)
 - Other repair data of general application

§ 26.43: TC Holders – Repairs

14 CFR	Required Data Submittal
§ 26.43(b)	List of Fatigue Critical Baseline Structure (FCBS)
§ 26.43(c)	Updated Published Repair Data
§ 26.43(e)	Repair Evaluation Guidelines

TC Holder Tasks & Deliverables For Existing Repairs

§ 26.43



Repair Evaluation Guidelines– TCH

Sections 216-219 of AC 120-93

To enable operators to address existing repairs, section 26.43(e) requires TC holders to develop repair evaluation guidelines that contain the following elements:

- A process for surveying airplane
- A process for obtaining DT data for repairs identified in survey, and
- An implementation schedule that provides timing for conducting surveys, and for incorporating DT data into the operators maintenance program.

Repair Evaluation Guidelines Versus Repair Assessment Guidelines

- **Repair Assessment Guidelines (RAG) were developed for certain pre-amendment 25-45 airplanes to enable operators to address repairs made to the pressure boundary.**
- **The REG provides instructions to an operator on how to obtain DT data for repairs installed on any part of airplane.**

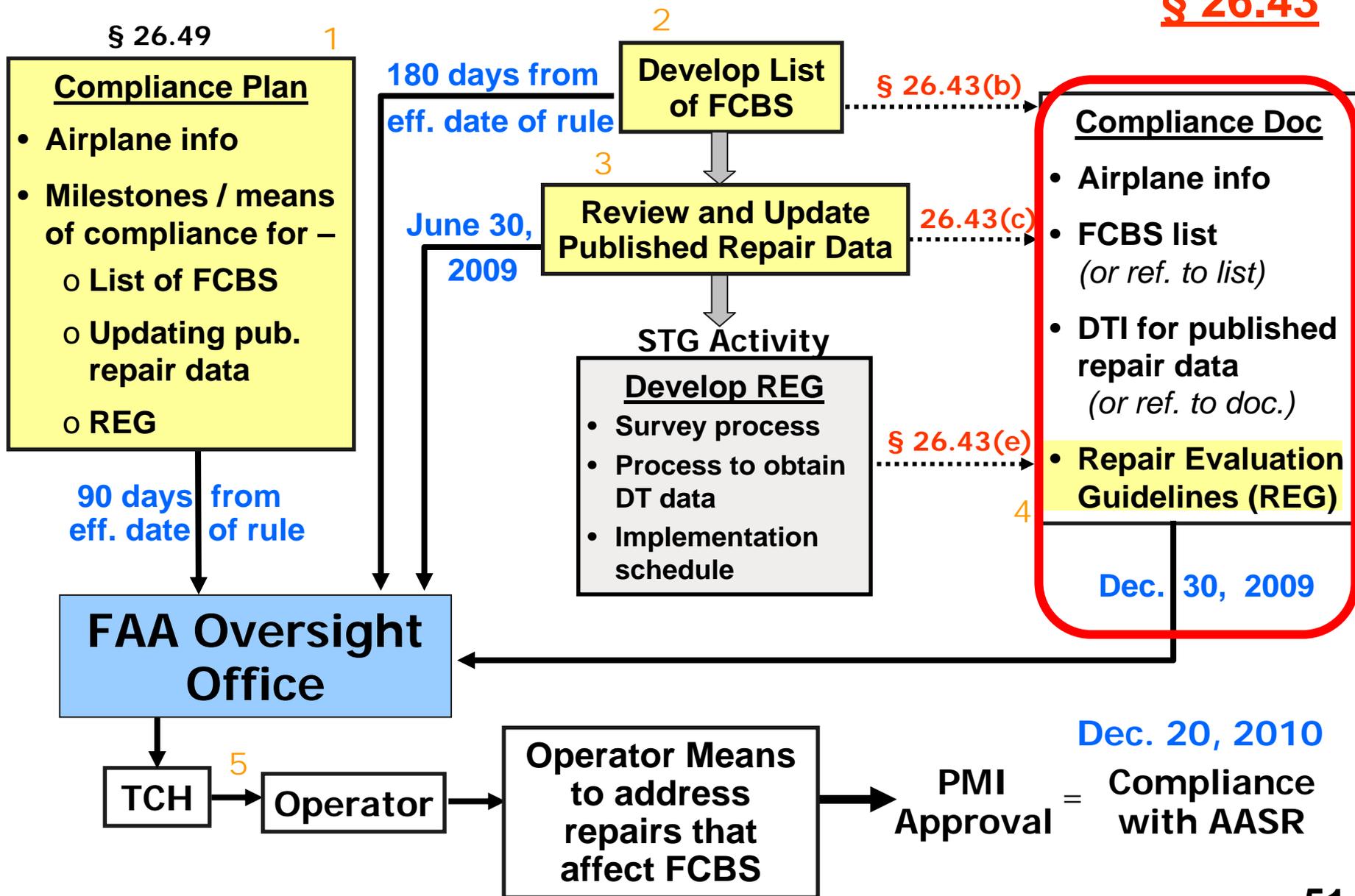
Structures Task Group (STG)

Section 105.d. of AC 120-93

- **TC holders are encouraged to use STG meetings to obtain operator input to support development of the REGs.**
- **FAA/Aviation-Authorities participation in STG will support an expedited review of REG** *(note the 12/30/09 compliance date for REG)*

TC Holder Tasks & Deliverables For Existing Repairs

§ 26.43



Summary of TC Holder Data Submittal

26.43(b): Develop list of FCBS

26.43(c): Update published repair data

26.43(e): Develop repair evaluation guidelines (REG)

26.43(f)(3): Future published repair data

26.43(d): Future repair data not published

Repair Data Approved After Jan 11, 08

26.43(f)(3): Future published repair data

For published repair data published after January 11, 2008, DT data must be submitted to FAA Oversight Office prior to approval of data.

26.43(f)(4): Future repair data not published

For repair data developed after January 11, 2008, DT must be submitted to FAA within 12 months of airplane's return to service, or in accordance with a schedule approved by the FAA.

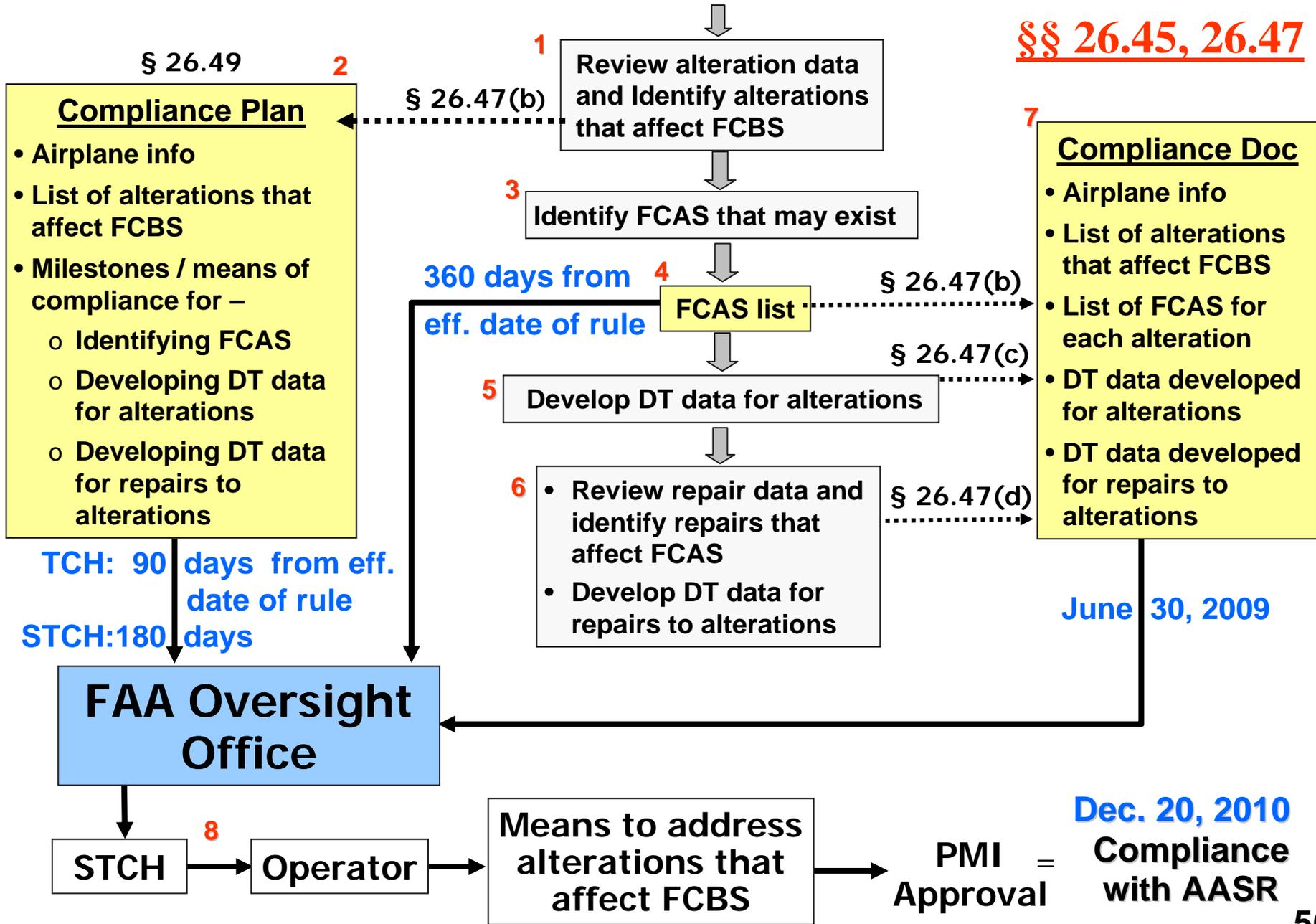
Part 26 DAH Rule Sections

14 CFR	Topic
§ 26.43	TC holders: repairs
§ 26.45	TC holders: alterations & repairs to alterations
§ 26.47	STC holders: alterations & repairs to alterations
§ 26.49	Compliance plan from TC & STC holders for §§ 26.43, 26.45, 26.47

Data Submittal & Compliance Dates– TCH / STCH Alterations

Rule	Data Submittal	Compliance Date
<p>§ 26.45(b) § 26.47(b)</p>	List of FCAS	360 days after eff. date of the rule
<p>§ 26.45(c) § 26.47(c)</p>	DT Data for Alterations that affect FCBS	June 30, 2009
<p>§ 26.45(d) § 26.47(d)</p>	DT Data for repairs to alterations ID'd in (c)	June 30, 2009

TC/STC Holder Tasks & Deliverables For Alterations



26.45/26.47: TC/STC Holder– Alterations

14 CFR	Required Tasks & Data Submittal
26.45(b)(1) 26.47(b)(1)	Identify alterations that affect FCBS
26.45(b)(2) 26.47(b)(2)	Develop & submit List of FCAS
26.45(c) 26.47(c)	Develop & submit DT data for alterations that affect FCBS
26.45(d) 26.47(d)	Develop & submit DT data for repairs made to alterations

Identify Alterations that Affect FCBS

Sections 26.45(b)(1) & 26.47(b)(1) require TC and STC holders to review their alteration data, and identify alterations that affect FCBS

Alterations that Affect FCBS

Section 305 of AC 120-93

An alteration that meets any of the following conditions is considered an alteration that affects FCBS:

- (1) The alteration is installed on or interfaces with FCBS.**
- (2) The alteration changes the fatigue load environment of FCBS.**
- (3) The alteration degrades the inspectability of the FCBS for existing inspection methods developed for the FCBS.**



What if List of FCBS is not Available in Time to Support Compliance Plan

If STC holders do not have list of FCBS from TC holder in time to support their compliance plan submittal, the following may be used to support determination that an alteration affects FCBS.

- AC 25.571, definition of principal structural element (PSE).
- Appendix 9 of AC 120-93, which provides a list of example alterations that likely affect FCBS.

26.45/26.47: TC/STC Holder– Alterations

14 CFR	Required Tasks & Data Submittal
26.45(b)(1) 26.47(b)(1)	Identify alterations that affect FCBS
26.45(b)(2) 26.47(b)(2)	Develop & submit List of FCAS
26.45(c) 26.47(c)	Develop & submit DT data for alterations that affect FCBS
26.45(d) 26.47(d)	Develop & submit DT data for repairs made to alterations

Establish List of FCAS

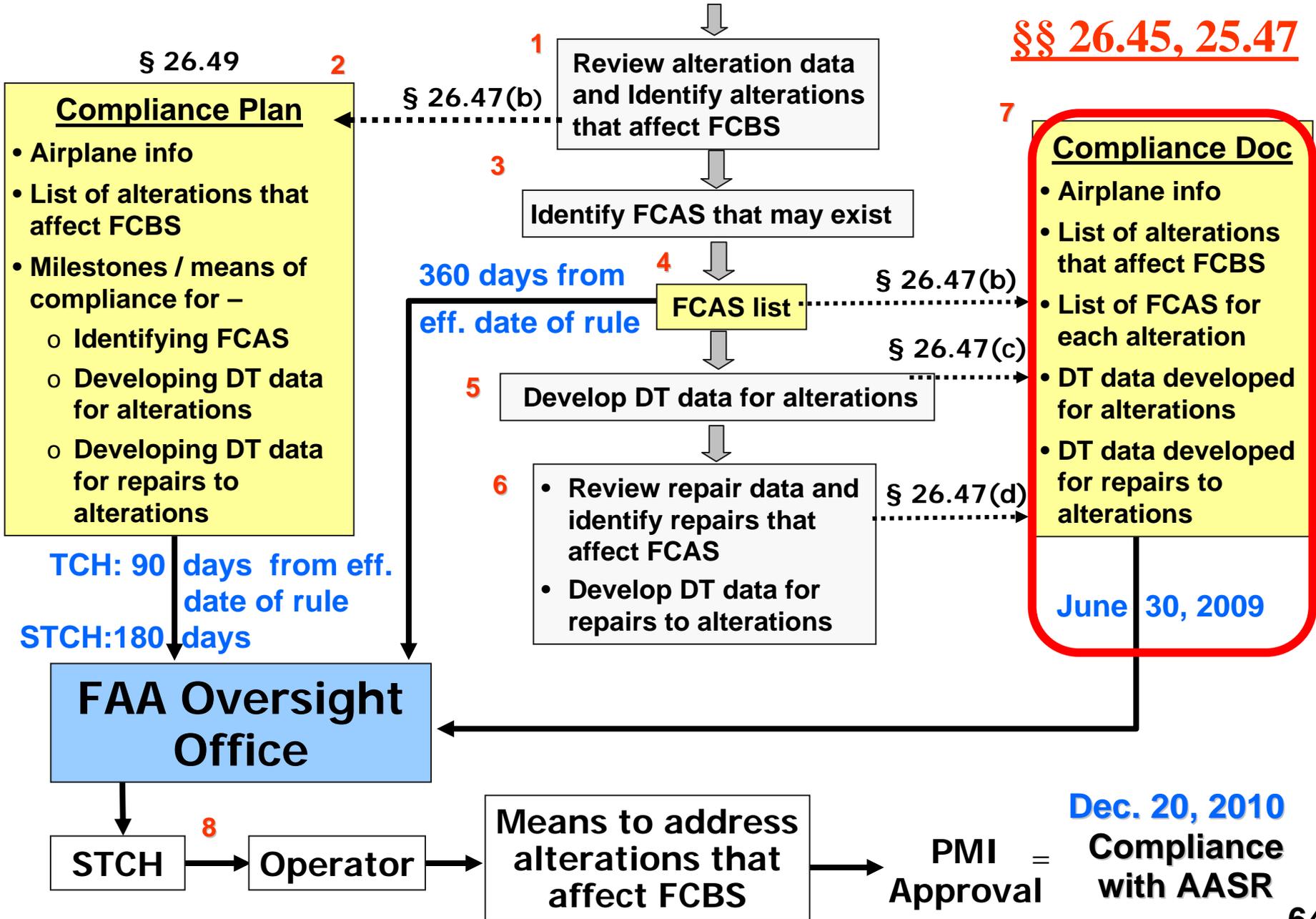
Section 306 of AC 120-93

- **For those alterations that affect FCBS, section 26.47(b)(4) requires the TC/STC Holder to determine if the alteration contains any fatigue critical structure (FCAS).**
- **The TC/STC Holder must submit a list of any FCAS to the FAA Oversight Office and make it available to operators upon approval.**

26.45/26.47: TC/STC Holder– Alterations

14 CFR	Required Tasks & Data Submittal
26.45(b)(1) 26.47(b)(1)	Identify alterations that affect FCBS
26.45(b)(2) 26.47(b)(2)	Develop & submit List of FCAS
26.45(c) 26.47(c)	Develop & submit DT data for alterations that affect FCBS
26.45(d) 26.47(d)	Develop & submit DT data for repairs made to alterations

TC/STC Holder Tasks & Deliverables For Alterations



Summary of Data Submittals for Alterations

14 CFR	Data Submittal	Due Date
26.49	Compliance Plan	TCH: 90 days after eff. date of rule STCH: 180 days
26.45(b) 26.47(b)	List of FCAS	360 days after eff. date of rule
	COMPLIANCE DOCUMENT	
	List of FCAS <i>(or ref. to it)</i>	
26.45(c) 26.47(c)	DT data for alterations that affect FCBS	June 20, 2009
26.45(d) 26.47(d)	DT data for repairs to alterations ID'd in (c)	June 20, 2009

Questions?

