

# DAH Familiarization Briefing



Federal Aviation  
Administration

## New Part 26 DAH Rule

### “Damage Tolerance Data for Repairs and Alterations”

Presented to: Design Approval Holders (DAH's)

By: Greg Schneider

Date: December 14, 2007



# Agenda



- Status on Issuance of Final DAH Rule and AC
- Objective of DAH Rule
- Background on Aging Airplane Safety Rule (AASR)
- Overview of AASR Damage Tolerance (DT) Requirements
- DAH Rule Requirements
- TC & STC Holder Tasks and Deliverables
- FAA/EASA Guidelines for Establishing Delegation Agreements

# Status on Issuance of DAH Rule and Supporting Guidance Material

- **The final DAH rule was issued on Dec. 12, 2007**
  - The effective date of the rule is Jan. 11, 2008.
- **AC 120-93 “DT Inspections for Repairs and Alterations” has also been issued.**
  - Supports TC and STC holder compliance with the DAH rule, and
  - Operator compliance with the AASR

# 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 (AASA):**

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

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  
(121.368, 129.33, 135.422)
- Damage tolerance-based inspections  
(121.1109 & 129.109)

**ALOHA Accident, 1988**



**Congress: 1991 AASA**



**AASR: 2005**

# 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

# 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.

# 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**

# 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

# Guidance Material

## **AC 120-93 “DT Inspections for Repairs and Alterations”**

**Provides guidance material that supports:**

- **TC & STC holder compliance with the DAH rule, and**
- **Operator compliance with the DT requirements of the AASR for repairs and alterations**

# 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.

# EU DAH Data Submittals

- **For all required data submittals, the EU DAHs will submit the data to the FAA through EASA.**
- **Data is to be submitted to EASA by the compliance date specified in the DAH rule.**



# FAA Approval of Data Submittals that are not Delegated to DAH

- **For all required data submittals where approval is retained by authorities, the FAA will approve the data after receiving EASA recommendation of approval.**
- **EASA will notify DAH of FAA approval**

# Part 26 DAH Rule Sections

<b>14 CFR</b>	<b>Topic</b>
<b>§ 26.43</b>	<b>TC holders: repairs</b>
<b>§ 26.45</b>	<b>TC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.47</b>	<b>STC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.49</b>	<b>Compliance plan from TC &amp; STC holders for §§ 26.43, 26.45, 26.47</b>

# Compliance Plan Submittal Dates



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

# Compliance Plan Elements

1. **Proposed project schedule for meeting compliance dates**
2. **Proposed means of compliance and identification of required compliance submittals**
3. **Proposal for submitting drafts of all compliance items**
4. **Proposal for how data will be made available to operators**

**NOTE: See section 108 of AC 120-93 and AC 26-1 for recommended content of compliance plan**



# Part 26 DAH Rule Sections

<b>14 CFR</b>	<b>Topic</b>
<b>§ 26.43</b>	<b>TC holders: repairs</b>
<b>§ 26.45</b>	<b>TC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.47</b>	<b>STC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.49</b>	<b>Compliance plan from TC &amp; STC holders for §§ 26.43, 26.45, 26.47</b>

# 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

# Part 26 DAH Rule Sections

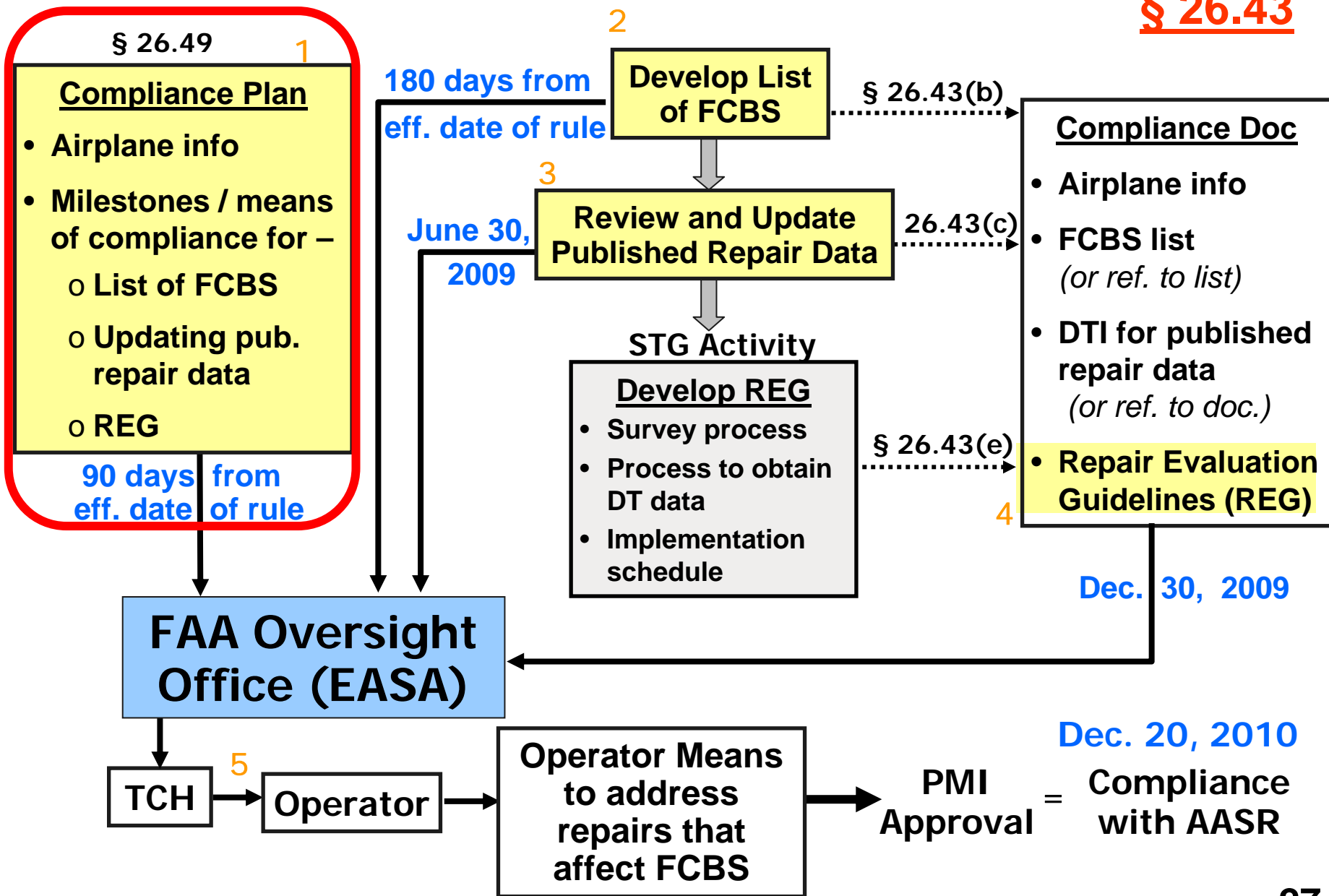
<b>14 CFR</b>	<b>Topic</b>
<b>§ 26.43</b>	<b>TC holders: repairs</b>
<b>§ 26.45</b>	<b>TC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.47</b>	<b>STC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.49</b>	<b>Compliance plan from TC &amp; STC holders for §§ 26.43, 26.45, 26.47</b>

# 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 Holder Tasks & Deliverables For Existing Repairs

**§ 26.43**



# § 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

# 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 typically be used as a starting point, with refinements applied to reduce the list.

# § 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

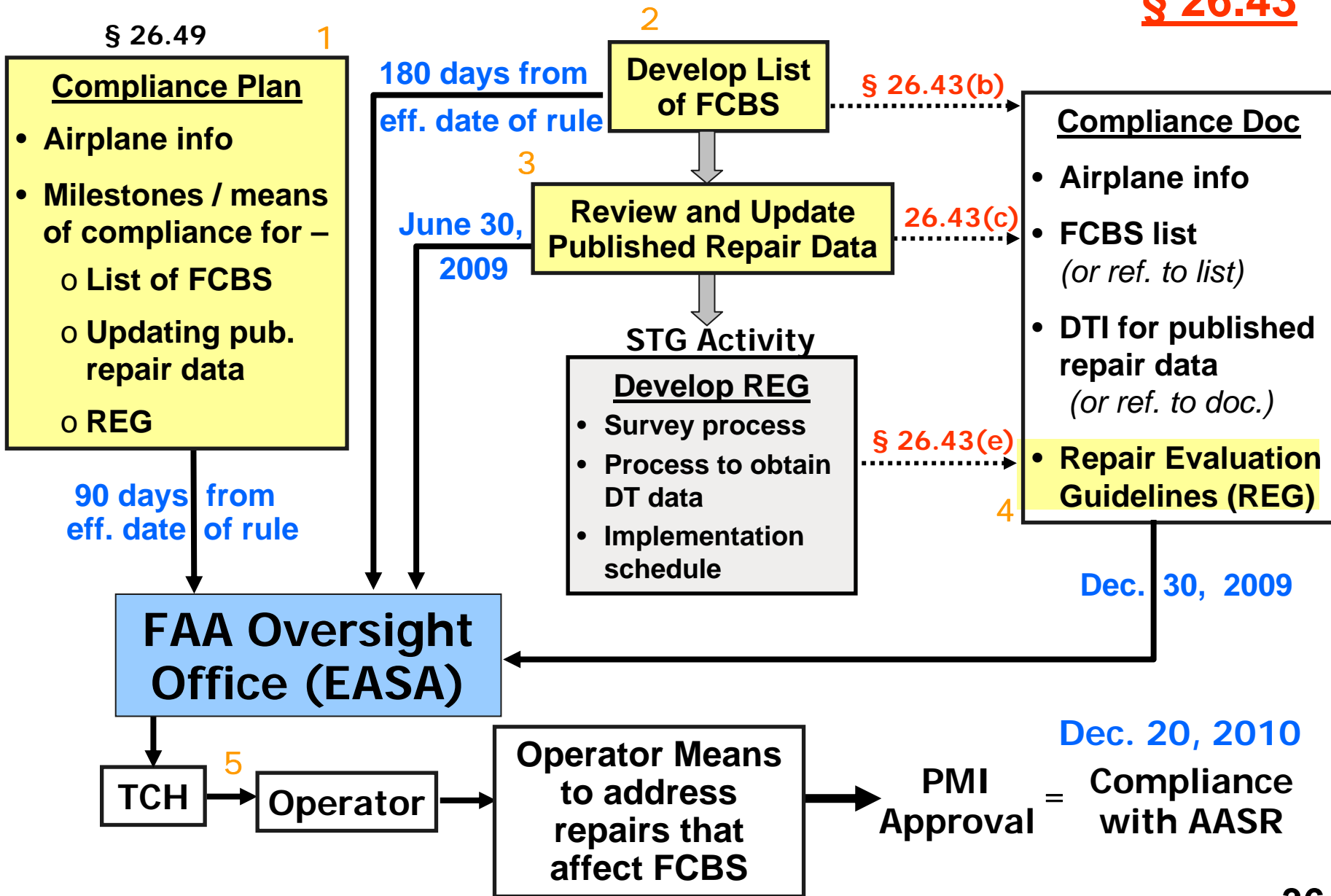
# Review Of Published Repair Data

## Section 206 of AC 120-XX

- **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

# TC Holder Tasks & Deliverables For Existing Repairs

**§ 26.43**



# § 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

# 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.**

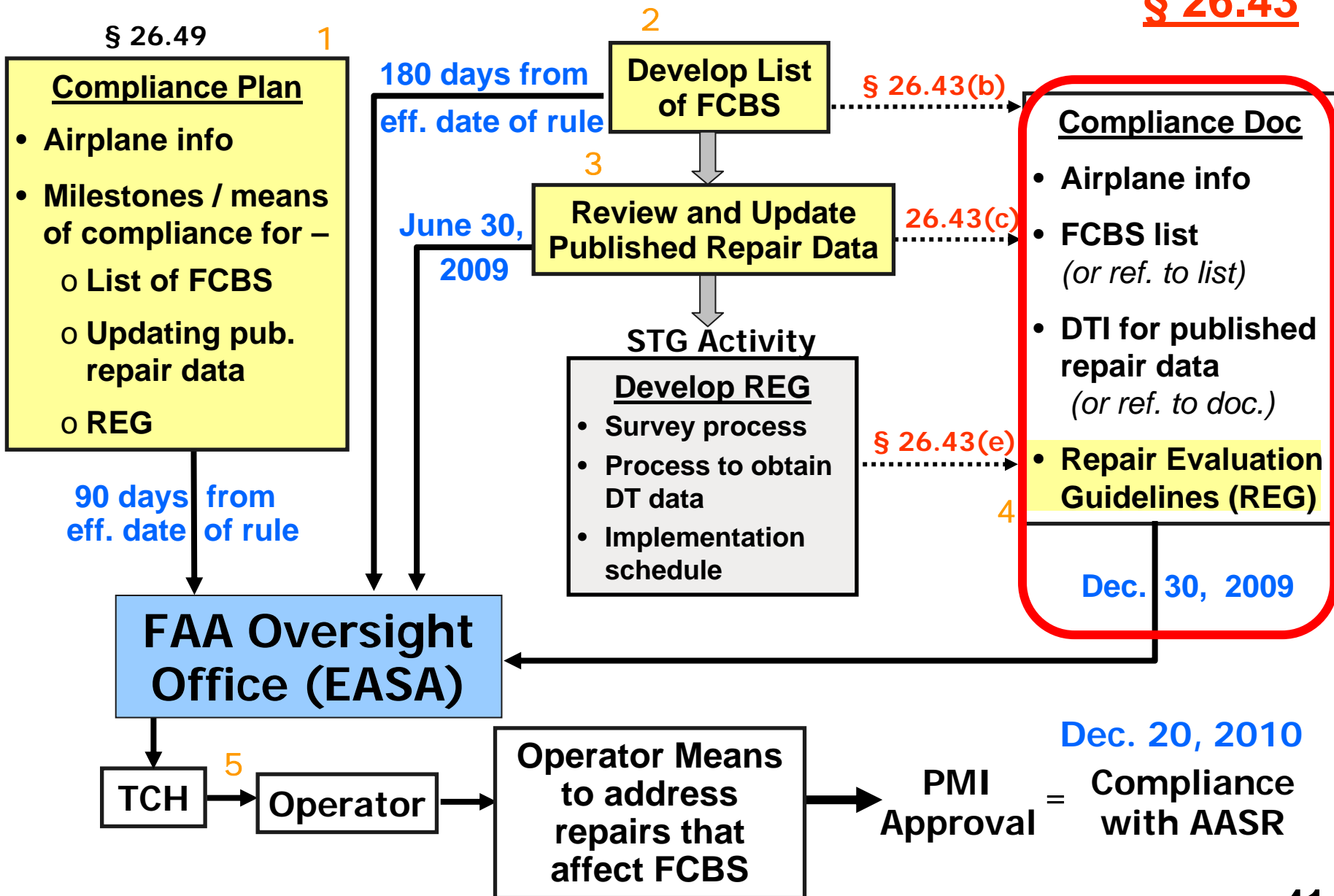
# Structures Task Group (STG)

## 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.**
- **The TC holder should notify the FAA Oversight Office (EASA) of its STG meeting schedule**
- **EASA/FAA 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**

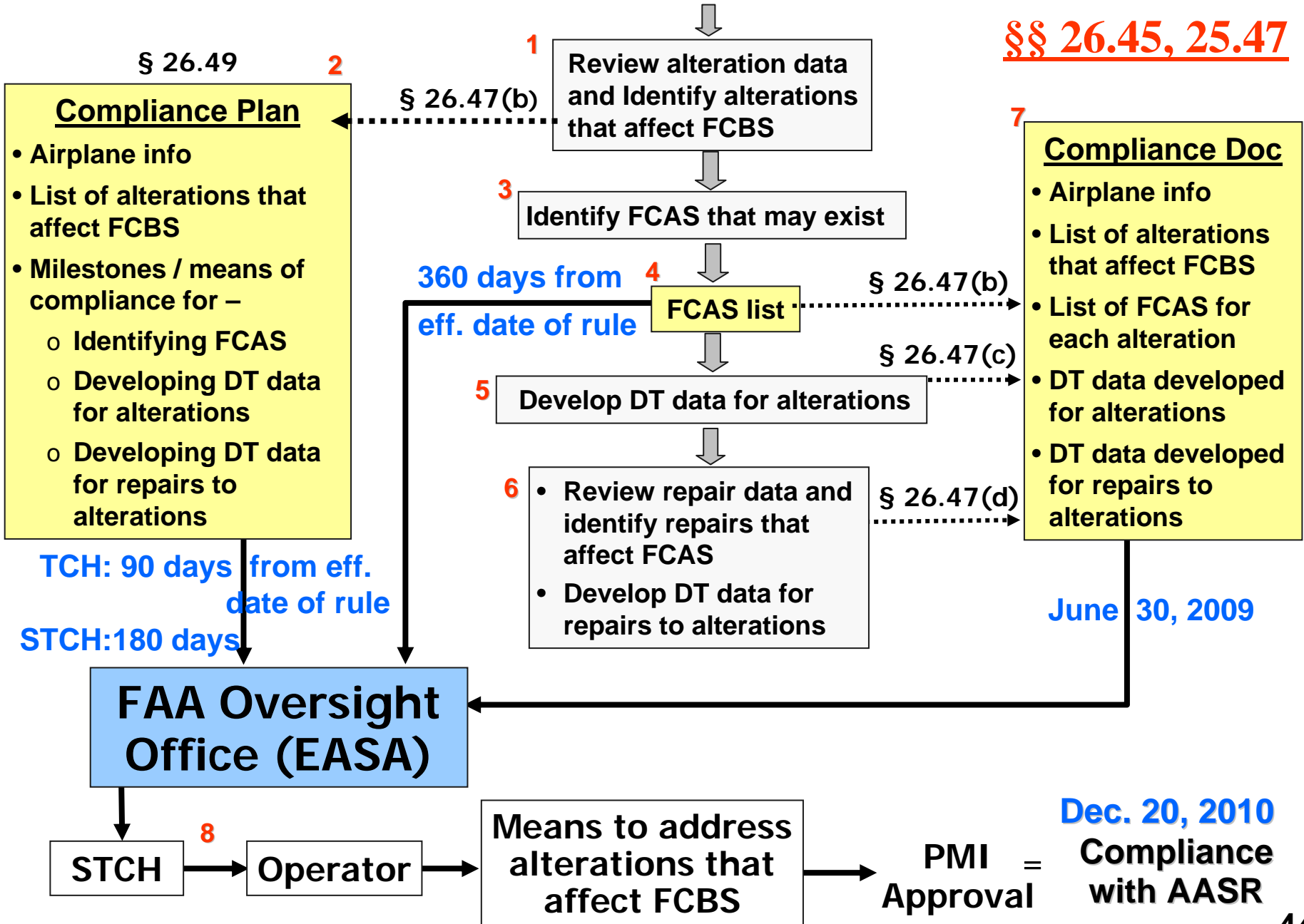
**26.43(d): Future repair data not published**

# Part 26 DAH Rule Sections

<b>14 CFR</b>	<b>Topic</b>
<b>§ 26.43</b>	<b>TC holders: repairs</b>
<b>§ 26.45</b>	<b>TC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.47</b>	<b>STC holders: alterations &amp; repairs to alterations</b>
<b>§ 26.49</b>	<b>Compliance plan from TC &amp; STC holders for §§ 26.43, 26.45, 26.47</b>

# TC/STC Holder Tasks & Deliverables For Alterations

§§ 26.45, 25.47



# 26.45/26.47: TC/STC Holder– Alterations

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

# 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
<b>26.45(b)(1)</b> 26.47(b)(1)	Identify alterations that affect FCBS
<b>26.45(b)(2)</b> 26.47(b)(2)	Develop & submit List of FCAS
<b>26.45(c)</b> 26.47(c)	Develop & submit DT data for alterations that affect FCBS
<b>26.45(d)</b> 26.47(d)	Develop & submit DT data for repairs made to alterations

# Establish List of FCAS

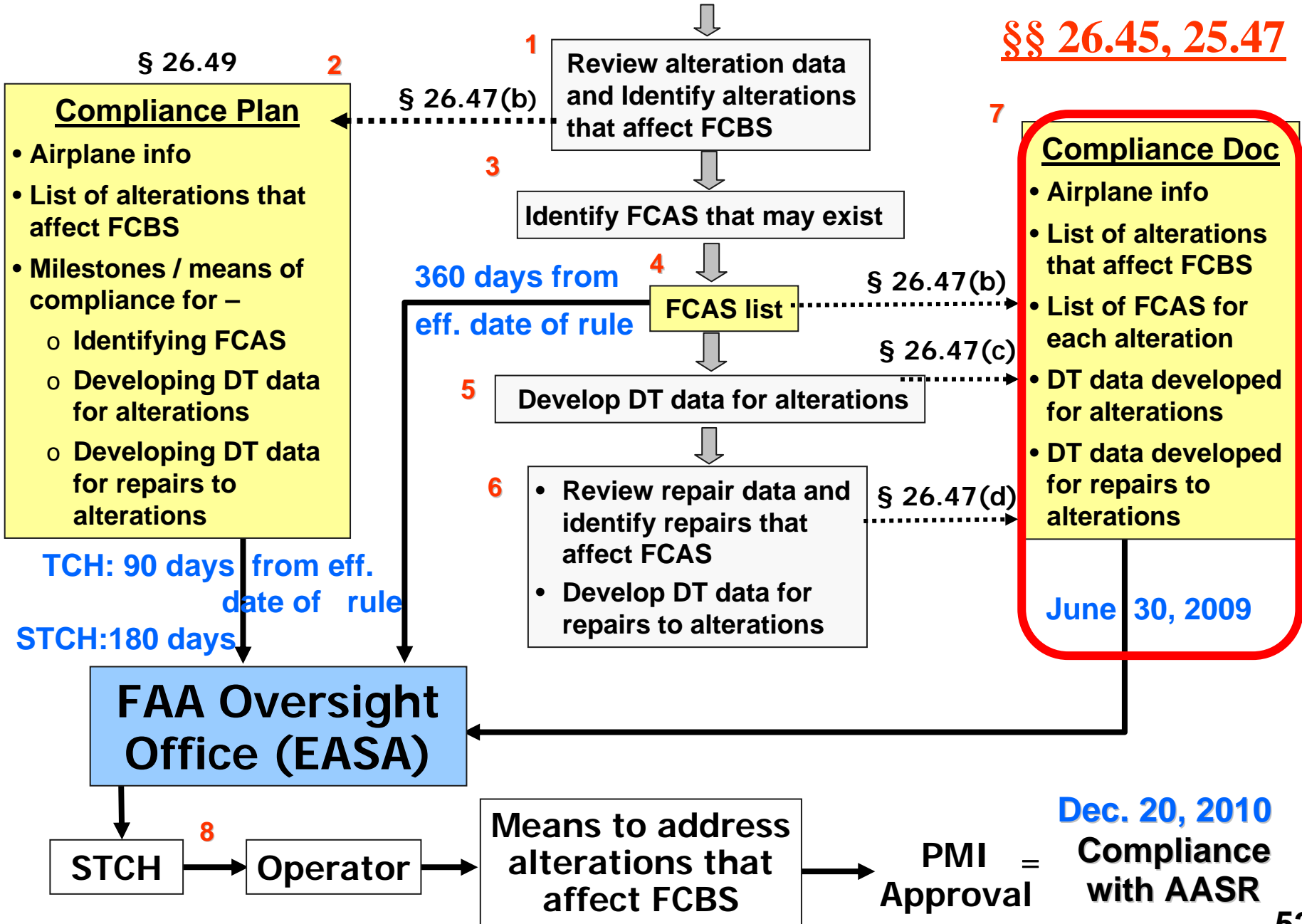
## Section 306 of AC 120-93

- **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 (EASA) and make it available to operators upon approval.**

# 26.45/26.47: TC/STC Holder– Alterations

14 CFR	Required Tasks & Data Submittal
<b>26.45(b)(1)</b> 26.47(b)(1)	Identify alterations that affect FCBS
<b>26.45(b)(2)</b> 26.47(b)(2)	Develop & submit List of FCAS
<b>26.45(c)</b> 26.47(c)	Develop & submit DT data for alterations that affect FCBS
<b>26.45(d)</b> 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	<b>Compliance Plan</b>	<b>TCH: 90 days</b> after eff. date of rule <b>STCH: 180 days</b>
<b>26.45(b)</b> <b>26.47(b)</b>	<b>List of FCAS</b>	360 days after eff. date of rule
	<b>COMPLIANCE DOCUMENT</b>	
	<b>List of FCAS</b> ( <i>or ref. to it</i> )	
<b>26.45(c)</b> <b>26.47(c)</b>	<b>DT data for alterations that affect FCBS</b>	<b>June 20, 2009</b>
<b>26.45(d)</b> <b>26.47(d)</b>	<b>DT data for repairs to alterations ID'd in (c)</b>	<b>June 20, 2009</b>

# Delegation Plan- TCH-Repairs, § 26.43

The TCH should coordinate its delegation plan with EASA. The following guidelines may be applied:

<b>FAA Regulation</b>	<b>Deliverable</b>	<b>Approval Process</b>
<b>26.49 TC/STC</b>	<b>Compliance Plan</b>	<b>Not Delegated</b>
<b>26.43- TC Repairs</b>		
<b>26.43 (b) &amp; (f)(1)</b>	<b>List of FCBS</b>	<b>First Model Not Delegated</b>
<b>26.43 (c) &amp; (f)(2)</b>	<b>Existing Published Repair Data</b>	<b>Apply Current Delegation</b>
<b>26.43 (c) &amp; (f)(3)</b>	<b>Future Published Repair Data</b>	<b>Apply Current Delegation</b>
<b>26.43 (d) &amp; (f)(4)</b>	<b>Future Unpublished Repair Data</b>	<b>Apply Current Delegation</b>
<b>26.43 (e) &amp; (f)(4)</b>	<b>REG</b>	<b>Not Delegated</b>

# Delegation Plan- TCH Alterations, § 26.45

The TCH should coordinate its delegation plan with EASA. The following guidelines may be applied:

<b>FAA Regulation</b>	<b>Deliverable</b>	<b>Approval Process</b>
<b>26.49 TC/STC</b>	<b>Compliance Plan</b>	<b>Not Delegated</b>
<b>26.45(c) &amp; (e)(2)</b>	<b>Existing Alteration Data</b>	<b>Current Delegation</b>
<b>26.45(c) &amp; (e)(3)</b>	<b>Future Alteration Data Approved on or After</b>	<b>Current Delegation</b>
<b>26.45(d) &amp; (e)(4)</b>	<b>Existing Repair Data</b>	<b>Current Delegation</b>
<b>26.45(d) &amp; (e)(5)</b>	<b>Future Repair Data Post Rule</b>	<b>Current Delegation</b>

# Questions?

