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Part-26

Ageing Aircraft Structures

STC Holder Info Session

14 April 2021

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Content

- → Objectives of the regulation
- → Background
- → Definitions
- → The regulation
- → Focus on requirements for STCHs / other change approval holders
- → Approval of data

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Objectives of the Regulation

Objective of the regulation

Prevent the catastrophic failure of large ageing aeroplanes due to fatigue and corrosion

Objectives

How is the objective met?

By setting specific objectives to address each of the following areas of risk:

- → Fatigue of the basic type design
- → Widespread fatigue damage (WFD)
- → Corrosion
- → Adverse effects of changes and repairs
- → Continued operation with unsafe levels of fatigue cracking

Objectives

To **prevent catastrophic fatigue failure** of the basic type design

The TCH is required to perform a Fatigue and **Damage Tolerance Evaluation** (DTE) and include the results in the ALS or in a Supplemental Structural Inspection Programme (SSIP).

The operator includes these inspections in the AMP.

Objectives

Rationale for damage tolerance evaluation and inspections:

Early fatigue requirements, such as ‘fail safe’ regulations, did not provide for timely inspection of an aircraft’s critical structure to ensure that damaged or failed components could be dependably identified and then repaired or replaced before hazardous conditions developed.

Aeroplanes certificated to fatigue requirements pre JAR 25 Change 7 / FAR Amdt. 25-45, did not address damage tolerance and still operate in Europe.

Many TCHs have developed supplemental inspection programmes (SSIPs) based on damage tolerance for these older aeroplanes, but this is not the case for all large aeroplanes.

Objectives

To **prevent widespread fatigue damage**

Certain TCHs are required to establish a **Limit of Validity (LoV)** of the Structural Maintenance Programme and establish maintenance actions based on a **WFD evaluation** of the type design.

The operator must include the LOV in the AMP and subsequently implement the maintenance actions

Objectives

Rationale for LoV and WFD evaluation:

It was generally assumed when fatigue and fail-safe rules were first implemented that any cracking that occurs on an aircraft operated up to the DSG will occur in isolation, originating from a single source, such as a random manufacturing flaw or a local design detail.

WFD in a structure is characterised by the simultaneous presence of cracks at multiple structural details that are of sufficient size and density whereby the structure will no longer meet the applicable residual strength requirements.

The F&DT requirements (JAR 25.571 Change 7 and CFR 14 § 25.571 Amdt 45 onward) and associated inspections were intended by Authorities to find and correct all forms of fatigue damage before they become critical and a similar approach to F&DT was used as a basis for the SSIDs.

Nonetheless, it has become apparent that as aircraft have approached and exceeded their DSG not all maintenance programmes have adequately addressed WFD and subsequent voluntary action by some TCHs to address WFD did not result in a uniform application of state of the art WFD prevention principles described in AMC 20-20 and the risk presented by WFD remains.

Objectives

To **prevent structural failure due to corrosion**

The TCH is required to develop a baseline corrosion prevention and control programme (CPCP).

The operator incorporates a CPCP in the AMP taking into account the baseline CPCP

Objectives

Rationale for CPCP:

Typically, existing large aeroplane structures are vulnerable to corrosion and most, but not all are subject to a CPCP. A CPCP is a systematic approach to prevent and to control corrosion in the aircraft's structure.

The objective of a CPCP is to limit the deterioration due to corrosion to a level necessary to maintain airworthiness (typically Level 1 corrosion or better) and where necessary to restore the corrosion protection schemes for the structure.

An effective CPCP not only limits the direct effects of corrosion, but helps prevent fatigue failures initiated by corrosion and the detrimental effects of fatigue and corrosion in combination.

Objectives

To **prevent structural fatigue failure due to the adverse effects of changes and repairs**

Fatigue and damage tolerance evaluations (DTE) and associated damage tolerance based inspections (DTI) are required for existing repairs and changes.

This requires a coordinated effort between the design approval holders and the operators upon whose aircraft the repairs or changes are implemented, to ensure the continued structural integrity of all relevant modified and repaired structure, based on damage tolerance principles, consistent with the safety level provided by the SSID or ALS as applied to the baseline structure.

Objectives

Rationale for DTE and DTI of repairs and changes:

Early fatigue or fail-safe requirements (pre-Amdt 45) did not necessarily provide for timely inspection of critical structure so that damaged or failed components could be dependably identified and repaired or replaced before a hazardous condition developed.

Repairs and changes can have an adverse effect on the fatigue and damage tolerance of the baseline structure of an aircraft by affecting fatigue cracking behaviour and the effectiveness of existing inspections.

SSIDs generally only addressed baseline structure. Furthermore, it is known that application of later fatigue and damage tolerance requirements to repairs and even some changes was not always fully implemented according to the relevant certification bases.

The DTE of repairs and changes is therefore required to maintain the level of safety intended by the implementation of SSIDs and ALS applicable to baseline structure.

Objectives

To **reduce the probability of continued operation with unsafe levels of fatigue cracking**

A process is required to be developed by TCHs that ensures the continued structural integrity programme remains valid and mandatory changes are implemented in cases where inspection alone is not reliable enough.

Objectives

Rationale for reducing the probability of continued operation with unsafe levels of fatigue cracking:

Service experience has demonstrated that there is a need to have continuing updated knowledge concerning the structural integrity of aircraft, especially as they become older.

Although damage tolerance based inspections are the state of the art for setting up an effective maintenance programme to ensure continued safe operation, they are only reliable if the assumptions on which they are based remain valid.

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Background

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Background – influential accidents

- → Comet DH-106 fuselage fatigue failures - 1954
  - → Changes in requirements to fail-safe
- → B707 Lusaka tailplane failure - 1977
  - → Changes in requirements to damage tolerance based inspections
- → B737 Aloha - 1988
  - → Changes in requirements to better address WFD and corrosion

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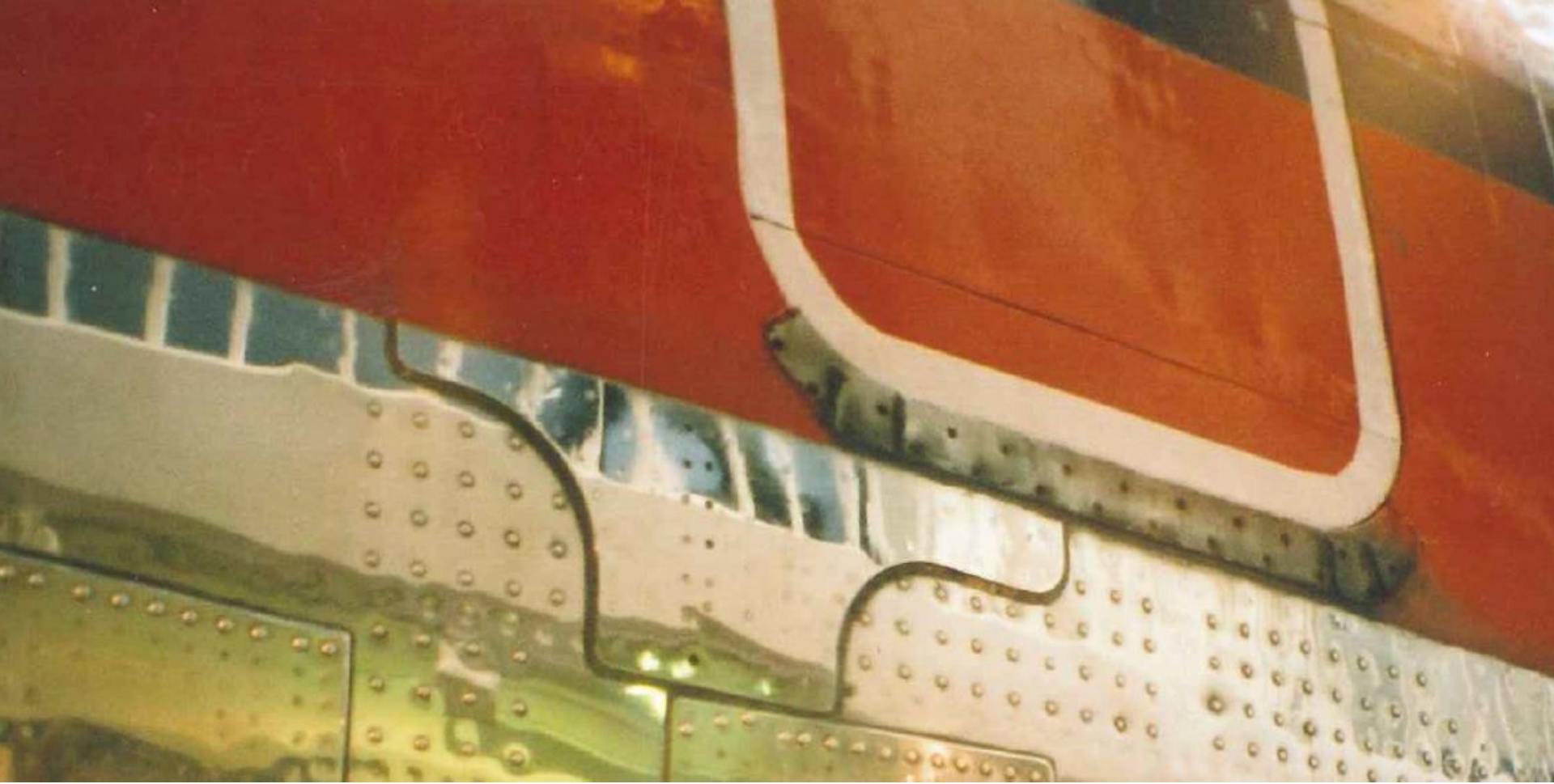

Background to the regulation

- In the EU, additional airworthiness requirements for operations started with JAR 26
- However most of these requirements were simple, and sufficient approved design data was known to exist to support them
- In the US, for more complex requirements such as occurred with SFAR 88 (Fuel Tank Safety) it was found that operators could fail to meet the requirements if not adequately supported by TCHs
- Therefore the regulations for ageing aircraft structures were amended to place requirements on design approval holders in addition to operators to ensure timely compliance

Background to the regulation (2)

- In the US, additional airworthiness requirements for DAHs were introduced in CFR14 Part 26 in 2008 for repairs and alterations and 2011 for LOV and WFD evaluation similar to Part-26.
- FAA used airworthiness directives for SSIDs and CPCPs
- Part 121 was amended to require operators to implement the LOV and prior to that implement DTI programmes including means to address repairs and alterations

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Definitions

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Definitions

- **CS-Definitions**
- **‘Large aeroplane’** means an aeroplane of more than 5 700 kg (12 500 pounds) maximum certificated take-off weight. The category ‘Large Aeroplane’ does not include the commuter aeroplane category (For commuter aeroplane category, see CS 23.1 and CS 23.3).

Definitions and abbreviations

ALS - 'Airworthiness limitation section (ALS)' means a section in the instructions for continued airworthiness, as required by points 21.A.61, 21.A.107 and 21.A.120A of Annex I (Part 21) to Regulation (EU) No 748/2012, that contains airworthiness limitations that set out each mandatory replacement time, inspection interval and related inspection procedure.

Baseline Structure - refers to the structure that is designed under the type certificate for that aeroplane model (that is, the 'as delivered aeroplane model configuration')

CPCP - 'Corrosion prevention and control programme (CPCP)' means a document reflecting a systematic approach to prevent and to control corrosion in an aeroplane's primary structure, consisting of basic corrosion tasks, including inspections, areas subject to those tasks, defined corrosion levels and compliance times (implementation thresholds and repeat intervals). A baseline CPCP is established by the type certificate holder, which can be adapted by operators to create a CPCP in their maintenance programme specific to their operations.

DTE - 'Damage tolerance evaluation (DTE)' is a process that leads to a determination of maintenance actions necessary to detect or preclude fatigue cracking that could contribute to a catastrophic failure. When applied to repairs and modifications, a DTE includes the evaluation of the repair or modification and the fatigue critical structure affected by the repair or modification.

Definitions and abbreviations

DTI - ‘Damage tolerance inspections (DTIs)’ means a documented inspection requirement or other maintenance action developed by holders of a type-certificate or restricted type-certificate as a result of a damage tolerance evaluation. A DTI includes the areas to be inspected, the inspection method, the inspection procedures (including the sequential inspection steps and acceptance and rejection criteria), the inspection threshold and any repetitive intervals associated with those inspections. DTIs may also specify maintenance actions such as replacement, repair or modification.

FCS - ‘Fatigue-critical structure (FCS)’ means a structure of an aeroplane that is susceptible to fatigue cracking that could lead to catastrophic failure.

FCBS - ‘Fatigue-critical baseline structure (FCBS)’ means the baseline structure of an aeroplane that is classified by the type certificate holder as a fatigue-critical structure.

FCMS - ‘Fatigue-critical modified structure (FCMS)’ means any fatigue critical structure of an aeroplane introduced or affected by a change to its type design and that is not already listed as part of the fatigue-critical baseline structure.

LOV - ‘Limit of validity (LOV)’ means, in the context of the engineering data that supports the structural maintenance programme, a period of time, stated as a number of total accumulated flight cycles or flight hours or both, during which it is demonstrated that widespread fatigue damage will not occur in the aeroplane.

Definitions and abbreviations

REG - ‘Repair evaluation guideline (REG)’ means a process established by the type certificate holder that guides operators to establish damage tolerance inspections for repairs that affect fatigue-critical structure to ensure the continued structural integrity of all relevant repairs.

WFD - ‘Widespread fatigue damage (WFD)’ means a simultaneous presence of cracks at multiple locations in the structure of an aeroplane that are of such size and number that the structure will no longer meet the fail-safe strength or residual strength used for certification of that structure.

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Commission Implementing Regulation (EU) 2020/1159 amending Regulation (EU) 2015/640 and (EU) 1321/2014

Ageing Aircraft Structures

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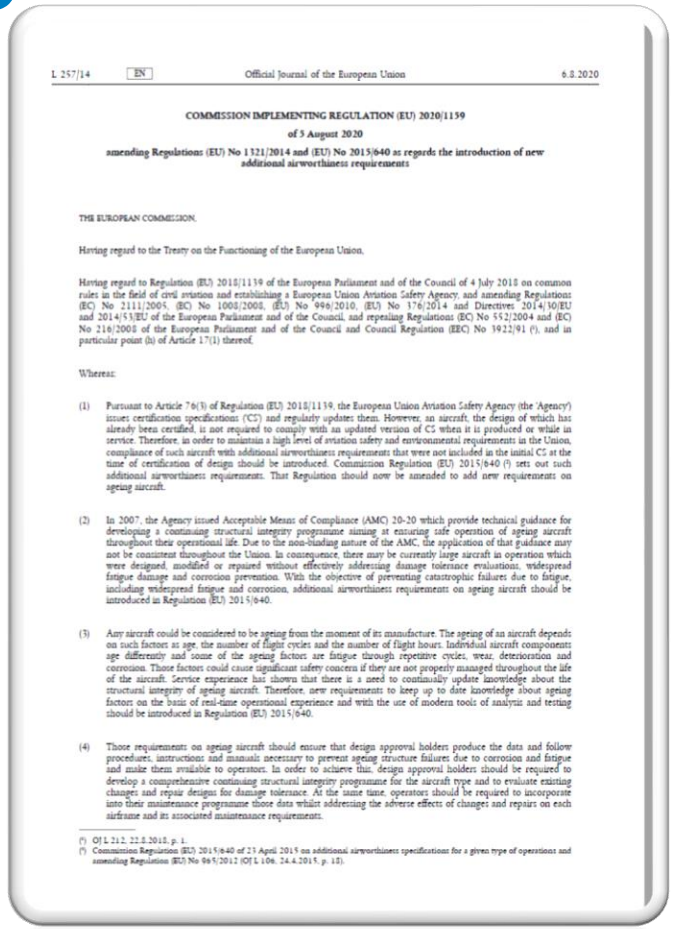
Regulation (EU) 2020/1159

- → amending Part M and **Part-26**
  - → Adopted on 5 August 2020
  - → Published in the OJ on 6 August 2020
  - → Entered into force on 26 August 2020
  - → Became applicable …..
    - → for ageing aircraft on **26 February 2021**
    - → and becomes applicable for conv. Class D compartments on 26 August 2023



L 257/14 EN Official Journal of the European Union 6.8.2020

COMMISSION IMPLEMENTING REGULATION (EU) 2020/1159

of 5 August 2020

amending Regulations (EU) No 1321/2014 and (EU) No 2015/640 as regards the introduction of new additional airworthiness requirements

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (1), and in particular point (b) of Article 17(1) thereof,

Whereas:

(1) Pursuant to Article 76(3) of Regulation (EU) 2018/1139, the European Union Aviation Safety Agency (the 'Agency') issues certification specifications ('CS') and regularly updates them. However, an aircraft, the design of which has already been certified, is not required to comply with an updated version of CS when it is produced or while in service. Therefore, in order to maintain a high level of aviation safety and environmental requirements in the Union, compliance of such aircraft with additional airworthiness requirements that were not included in the initial CS at the time of certification of design should be introduced. Commission Regulation (EU) 2015/640 (2) sets out such additional airworthiness requirements. That Regulation should now be amended to add new requirements on ageing aircraft.

(2) In 2007, the Agency issued Acceptable Means of Compliance (AMC) 20-20 which provide technical guidance for developing a continuing structural integrity programme aiming at ensuring safe operation of ageing aircraft throughout their operational life. Due to the non-binding nature of the AMC, the application of that guidance may not be consistent throughout the Union. In consequence, there may be currently large aircraft in operation which were designed, modified or repaired without effectively addressing damage tolerance evaluations, widespread fatigue damage and corrosion prevention. With the objective of preventing catastrophic failures due to fatigue, including widespread fatigue and corrosion, additional airworthiness requirements on ageing aircraft should be introduced in Regulation (EU) 2015/640.

(3) Any aircraft could be considered to be ageing from the moment of its manufacture. The ageing of an aircraft depends on such factors as age, the number of flight cycles and the number of flight hours. Individual aircraft components age differently and some of the ageing factors are fatigue through repetitive cycles, wear, deterioration and corrosion. Those factors could cause significant safety concerns if they are not properly managed throughout the life of the aircraft. Service experience has shown that there is a need to continually update knowledge about the structural integrity of ageing aircraft. Therefore, new requirements to keep up to date knowledge about ageing factors on the basis of real-time operational experience and with the use of modern tools of analysis and testing should be introduced in Regulation (EU) 2015/640.

(4) Those requirements on ageing aircraft should ensure that design approval holders produce the data and follow procedures, instructions and manuals necessary to prevent ageing structure failures due to corrosion and fatigue and make them available to operators. In order to achieve this, design approval holders should be required to develop a comprehensive continuing structural integrity programme for the aircraft type and to evaluate existing changes and repair designs for damage tolerance. At the same time, operators should be required to incorporate into their maintenance programme those data whilst addressing the adverse effects of changes and repairs on each airframe and its associated maintenance requirements.

(1) OJ L 212, 22.8.2018, p. 1.
(2) Commission Regulation (EU) 2015/640 of 23 April 2015 on additional airworthiness specifications for a given type of operations and amending Regulation (EU) No 965/2012 (OJ L 106, 24.4.2015, p. 18).

Opinion 12/2016 vs Reg. (EU) 2020/1159

→ Regulatory proposal compared to EASA Opinion 12/2016

Split into a delegated act and an implementing act to reflect the new delegation provisions in the basic Regulation 2018/1139

Restructured to improve legal clarity

Exclusion criteria encompassed directly in Part-26

NO IMPACT on rights and obligations of the regulated entities

Opinion 12/2016 vs Reg. (EU) 2020/1159

Opinion 12/2016	Reg. (EU) 2020/1159	Remarks
26.10	26.10	
26.30	26.30	
26.300	26.300, 26.301, 26.302, 26.303, 26.304, 26.305, 26.306	
26.300(f)	21.A.65	Delegated act for future applications
26.310	21.A.101(h) and 21.A.433(a)(5)	Delegated act for future applications
26.320	26.301, 26.307, 26.308, 26.309	
26.330	26.330, 26.331, 26.332, 26.333, 26.334	
26.350	21.A.101(h)	Delegated act for future applications
26.360	21.A.101(h) and 21.A.433(a)(5)	Delegated act for future applications
26.370	26.370	

Overall view

TC holders: establish a continuing structural integrity programme

TC/STC holder: Damage Tolerance Evaluation of existing changes and published repairs to FCS

coming soon

Part 21

Part 26 & Part M

Operators: incorporate ageing aircraft related tasks/actions in the AMP, including plan to address the adverse effects of repairs and modifications

TC/STC applicants: mandatory compliance with ageing aircraft structures requirements for future changes/repairs

26.300-> 26.306 Continuing Structural Integrity for ageing aircraft structures — General requirements

Who ?

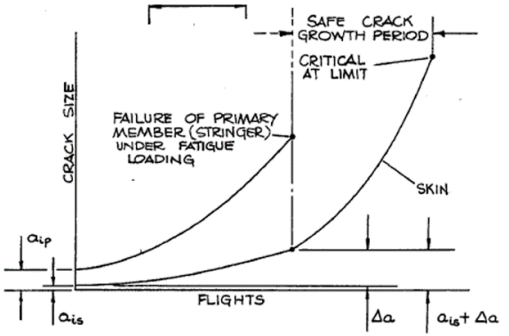
(R)TCHs

What ?

- Compliance plan
- Fatigue and damage tolerance evaluations
- Limit of Validity (LOV) determination
- Identify existing maintenance actions further actions to preclude widespread fatigue damage (WFD)
- Baseline Corrosion prevention and control programme (CPCP)
- A process to ensure continued validity of the structural integrity programme
- Identification of Fatigue critical baseline structure (FCBS)

Compliance time: **specific for each point, ranging from 3 to 60 months from applicability.**

26.307->26.309 Damage tolerance data for existing repairs and existing changes to fatigue-critical structure



Who ?

(R)TCH

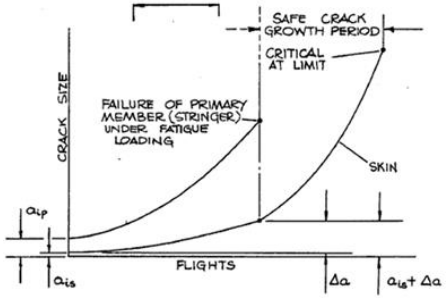
What ?

- **Compliance plan (in point 26.301)**
- **Identify all changes that affect FCBS**
  List FCMS
- **Perform DTE and develop DTI**
- **Establish an implementation schedule that provides timelines for conducting aircraft surveys, DTI and incorporate this in maintenance programme**

Compliance time: **specific for each point, from 3 to 24 months**

FCMS: fatigue-critical modification structure
DTE: damage tolerance evaluation
DTI: damage tolerance inspection

26.330->26.334 Damage tolerance data for existing STCs, other existing major changes and existing repairs affecting those changes or STCs



Who ?

STCH

What ?

Compliance plan

Review the changes and identify those that affect FCBS
List changes affecting FCBS
List FCMS

Perform DTE and develop DTI

Compliance time: **specific for each point, from 6 to 24 months**

FCMS: fatigue-critical modified structure
DTE: damage tolerance evaluation
DTI: damage tolerance inspection

26.370 Continuing airworthiness tasks and aircraft maintenance programme

Who ?

Operator / Owner

What ?

- **Include in the AMP an approved damage tolerance-based inspection programme.**
- **Address adverse effects of repairs and modifications on fatigue-critical structure and on inspections**
- **CPCP**
- **Limitations on the use of the maintenance programme (e.g. LOV)**

Compliance time: **specific for each point, from 6 to 36 months**

AMP: aircraft maintenance programme
CPCP: corrosion prevention and control programme
LOV: limit of validity

Material supporting implementation

→ Part 26 is a Regulation of the EU, it contains the requirements to be complied with by regulated entities

- **Who has to do what and by when…**

→ To support the application of this ‘hard law’, EASA develops

- Certification specifications (**CS-26**)
- Guidance Material (**GM**)

which can be used by regulated entities and competent authorities

CS-26

- CS-26 is the standard means to show compliance of product with the requirements of Part-26.
- When CS-26 exists, regulated entities may follow it to demonstrate compliance with the related requirement of Part-26
- When the contents of CS-26 is properly implemented by the regulated entity, the related requirements of Part-26 shall be considered as met (=> presumption of compliance).

GM-26

→ Guidance Material (GM)

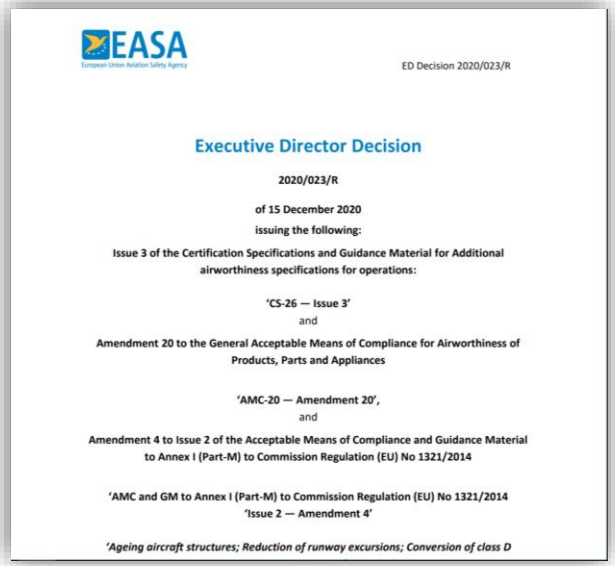
- Illustrate the meaning of a Part-26 point
- Supports the interpretation of it (e.g. explanations, examples, background..)
- Has (differently from CS-26) no presumption of compliance

ED Decision 2020/023/R

→ Amending **CS-26**, **AMC-20** and **AMC/GM to Part-M**

→ Published on 15 December 2020

→ Entered into force on **17 December 2020**



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ED Decision 2020/023/R

Executive Director Decision

2020/023/R

of 15 December 2020

issuing the following:

Issue 3 of the Certification Specifications and Guidance Material for Additional airworthiness specifications for operations:

'CS-26 — Issue 3'

and

Amendment 20 to the General Acceptable Means of Compliance for Airworthiness of Products, Parts and Appliances

'AMC-20 — Amendment 20',

and

Amendment 4 to Issue 2 of the Acceptable Means of Compliance and Guidance Material to Annex I (Part-M) to Commission Regulation (EU) No 1321/2014

'AMC and GM to Annex I (Part-M) to Commission Regulation (EU) No 1321/2014 'Issue 2 — Amendment 4'

'Ageing aircraft structures; Reduction of runway excursions; Conversion of class D

- *AMC-20 amended to introduce the latest available material and to align it with the new ageing aircraft requirements*
- *CS-26 amendment contains new GM-26*

Part-M

→ Changes in Regulation (EU) 1321/2014

M.A.302 Aircraft Maintenance Programme (AMP)

- a new bullet point is added to clarify that the AMP must also establish compliance with the applicable provisions of Part 26.

Next Step - Part 21

→ Expected changes in Regulation (EU) 748/2012

21.A.44 Obbligations of the holder

- amended to add reference to the new point 21.A.65

21.A.65: Continuing structural integrity for aeroplanes structures

- New point requiring TCHs of large aeroplanes to ensure that the continuing structural integrity programme remains valid throughout the operational life of the aeroplane

21.A.101 TC basis, OSD certification basis and EP requirements for a major change to a type-certificate

- new bullet has been added to ensure that the level of safety achieved by compliance with the ageing aircraft rule is maintained for future structural changes to the product (large aeroplanes only).

21.A.433 Requirements for approval of a repair design

- new bullet has been added to ensure that the level of safety achieved by compliance with the ageing aircraft rule is maintained for future structural repairs to the product (large aeroplanes only).

Expected text of point 21.A.65

- **“21.A.65 Continuing structural integrity for aeroplanes structures**
- The holder of the type-certificate or restricted type-certificate for a large aeroplane shall ensure that the continuing structural integrity programme remains valid throughout the operational life of the aeroplane, taking into account service experience and current operations”

Expected amendment of point 21.A.101

- “(b) Except as provided in point (h), by derogation from point (a), an earlier amendment to a certification specification referred to in point (a) and to any other certification specification which is directly related may be used in any of the following situations, unless the earlier amendment became applicable before the date at which the corresponding certification specifications incorporated by reference in the type-certificate became applicable:”;

……..

- “(h) For large aeroplanes subject to point 26.300 of Annex I to Regulation (EU) 2015/640*, the applicant shall comply with certification specifications that provide at least an equivalent level of safety to points 26.300, 26.320 and 26.330 of Annex I to Regulation (EU) 2015/640, except for applicants for supplemental type-certificates who are not required to take into account point 26.303.”

Expected amendment of point 21.A.433

- in point 21.A.433(a) the following point (5) is added:
- “5. when, for a repair to an aeroplane subject to point 26.302 of Annex I to Regulation (EU) 2015/640, it has been demonstrated that the structural integrity of the repair and affected structure is at least equivalent to the level of structural integrity established for the baseline structure by point 26.302 of Annex I to Regulation (EU) 2015/640.”

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Focus on requirements for STCHs

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STCH Rule Applicability

- **26.330 Damage tolerance data for existing supplemental type-certificates (STCs), other existing major changes and existing repairs affecting those changes or STCs**
- (a) A holder of a STC issued before 26 February 2021 for a major change, or a holder of a major change that has been deemed approved in accordance with Article 4 of Regulation (EU) No 748/2012, for large aeroplanes certified on or after 1 January 1958 to carry 30 or more passengers or that have a payload capacity of 3 402 kg (7 500 lbs) or more, shall support operators required to comply with point 26.370(a)(ii) by addressing the adverse effects of those changes and repairs to those changes on the aeroplane structure and shall comply with the requirements set out in points 26.331 to 26.334.

Applicability

- Applicability turbine powered large aeroplanes
- **CS-Definitions**
- **‘Large aeroplane’** means an aeroplane of more than 5 700 kg (12 500 pounds) maximum certificated take-off weight. The category ‘Large Aeroplane’ does not include the commuter aeroplane category (For commuter aeroplane category, see CS 23.1 and CS 23.3).

STCH Exceptions to applicability

- (b) Paragraph (a) shall not apply to major changes and repairs to an aeroplane model first certified prior to 26 February 2021 when that aeroplane model meets any of the following conditions:
- (i) it is listed in Table A.1 of Appendix 1 (to Part-26);
- (ii) it does not operate anymore after 26 February 2021;
- (iii) it has not been certified to conduct civil operation with a payload or passengers;
- (iv) it has a restricted TC and have been certified in accordance with damage tolerance requirements, provided that it is not operated beyond 75 % of its design service goal and is primarily operated in support of the restricted TC holders manufacturing operation;
- (v) it is certified with a restricted TC and is designed primarily for firefighting;

List of aeroplanes not subject to 1 or more requirement

TC Holder	Type	Models	Not applicable Part-26 points
The Boeing Company	707	All	26.301 to 26.334
The Boeing Company	720	All	26.301 to 26.334
The Boeing Company	DC-10	DC-10-10, DC-10-30, DC-10-30F	26.301 to 26.334
The Boeing Company	DC-8	All	26.301 to 26.334
The Boeing Company	DC-9	DC-9-11, DC-9-12, DC-9-13, DC-9-14,DC-9-15, DC-9-15F, DC-9-21, DC-9-31,DC-9-32, DC-9-32 (VC-9C), DC-9-32F,DC-9-32F (C-9A, C-9B), DC-9-33F, DC-9-34, DC-9-34F, DC-9-41, DC-9-51	26.301 to 26.334
The Boeing Company	MD-90	MD-90-30	26.301 to 26.334
FOKKER SERVICES B.V.	F27	Mark 100, 200, 300, 400, 500, 600, 700	26.301 to 26.334
FOKKER SERVICES B.V.	F28	Mark 1000, 1000C, 2000, 3000, 3000C, 3000R, 3000RC, 4000	26.301 to 26.334
GULFSTREAM AEROSPACE CORP.	G-159	G-159 (Gulfstream I)	26.301 to 26.334
GULFSTREAM AEROSPACE CORP.	G-II_III_IV_V	G-1159A (GIII), G-1159B (GIIB), G-1159 (GII)	26.301 to 26.334
KELOWNA FLIGHTCRAFT LTD.	CONVAIR 340/440	440	26.301 to 26.334
LEARJET INC.	Learjet 24/25/31/ 36/35/55/60	24,24A,24B,24B-A,24D, 24D-A,24F,24F A,25,25B,25C,25D,25F	26.301 to 26.334
LOCKHEED MARTIN CORPORATION	1329	All	26.301 to 26.334
LOCKHEED MARTIN CORPORATION	188	All	26.301 to 26.334
LOCKHEED MARTIN CORPORATION	382	382, 382B, 382E, 382E, 382F, 382G	26.301 to 26.334
LOCKHEED MARTIN CORPORATION	L-1011	All	26.301 to 26.334
PT. DIRGANTARA INDONESIA	CN-235	All	26.301 to 26.334
SABRELINER CORPORATION	NA-265	NA-265-65	26.301 to 26.334
VIKING AIR LIMITED	SD3	SD3-30, Sherpa, SD3 Sherpa	26.301 to 26.334
VIKING AIR LIMITED	DHC-7	All	26.301 to 26.334
TUPOLEV PUBLIC STOCK COMPANY	TU-204	204-120CE	26.301 to 26.334

STCH Exceptions cont.

- (c) Paragraph (a) shall not apply to major changes and repairs to an aeroplane first certified prior to 26 February 2021 when the changes or repairs are not, and will not be, embodied on any aeroplane in operation on or after 26 August 2022.

- (d) The exceptions provided for in paragraph (b)(ii) to (b)(v) and (c) shall apply only after the change approval holder submits a list of changes that affect fatigue-critical baseline structure, together with information supporting the reasons why each change has been included in the list, to the Agency before 26 February 2022 for approval.

STCH Exceptions to applicability

- **GM1 26.300(c) and 26.330(c) Substantiation of change and repair status**
- The demonstration that a change or repair will not be incorporated into any other aeroplane can be achieved by:
- (a) providing evidence that there are no available kits for such changes or repairs; or
- (b) providing evidence that if kits are available, they will not be sold; or
- (c) ensuring that no future production of such change/repair kits is permitted; or
- (d) limiting the applicability of the changes and repairs subject to point 26.300(c) of Part-26 by updating the associated instructions for continued airworthiness.

STCH Compliance plan rule

- **26.331 Compliance Plan for STC holders** A holder of a change approval shall:
- (a) establish a compliance plan that addresses the requirements of points 26.332 to 26.334;
- (b) submit the compliance plan referred in paragraph (a) to the Agency before 25 August 2021, for approval.

- Note: No action is required for STCHs that do not hold design approvals for changes that affect FCBS

Means of compliance and guidance material

- **CS-26**
- **CS 26.1 Purpose and scope**
- This CS is the standard means to show compliance of products with the requirements of Annex I (Part-26) to Commission Regulation (EU) 2015/640.
- Book 1 specifies means of compliance
- GM (Guidance Material) is found in Book 2 of CS-26

STCH Compliance plan MoC

- **CS 26.331 Compliance plan for STC holders**
- Compliance with point 26.331 of Part-26 is demonstrated when a compliance plan exists that includes:
- (a) a project schedule identifying all the major milestones for meeting the compliance times specified in points 26.332 to 26.334 of Part-26;
- (b) an explanation of how the changes that affect the FCS will be identified and presented;
- (c) a proposed means of compliance with the DTE required by points 26.333 and 26.334 of Part-26;
- (d) a plan for submitting drafts of all the compliance items required by point 26.330 of Part-26 for review by EASA not less than 60 days before the applicable compliance date.

List of changes, FCMS list and DT data

- The applicable rules and time lines are dependent on the date of issue of the STC approval

- **STCs approved prior to 1 Sept 2003**
- follow points 26.332(a) and (c) and 26.334

- **STCs approved on or after 1 sept 2003**
- follow points 26.332(a) and (b) and 26.333

Changes approved on or after 1 September 2003

- **26.332 (a) and (b) and 26.333 Identification of changes affecting fatigue critical structure, FCMS and DT data for those changes**
- The holder of these change approvals shall:
  - list all changes that affect FCBS
  - list FCMS for each of those changes
  - before 26 February 2022 submit the lists to the Agency for approval
  - identify any published repairs to those changes (see CS-26, GM1 26.332(a)(iii))
  - perform DTE of those changes and for published repairs to those changes
  - establish and document DTI for those changes
  - before 26 February 2023 submit* the DT data (DTE plus DTI) to the agency for approval (or, if later and only for a change without DT in the certification basis, before the aeroplane operates in accordance with Annex IV (Part-CAT) to Regulation (EU) No 965/2012)
  - *unless the DT data is already complete and approved under the STC as allowed under 26.333(b)
  - make approved data available to operators

Changes approved before 1 September 2003

- **26.332 (a) and (c) Identification of changes affecting fatigue critical structure**
- The holder of these change approvals shall
  - list changes that affect FCBS (Note: if it is not easy to confirm in time whether FCBS is affected, the change should be included in the list with that doubt annotated)
  - before 26 February 2022, submit the list of changes to the Agency
  - make the list available to operators required to comply with paragraph (b)(ii) of point 26.370
  - pay attention to requests from operators for identification of FCMS and DT data for a change on that list

26.334 Damage tolerance data for STCs and other changes and repairs to those changes approved before 1 September 2003

Per Annex I of regulation (EU) 2020/1159 amending 2015/640

(a) A holder of a change approval that was issued before 1 September 2003 shall:

(i) for changes and published repairs identified in accordance with paragraph (a)(i) of point 26.332 and paragraph (a)(ii) of point 26.332 perform a damage tolerance evaluation;

(ii) establish and document the associated damage tolerance inspection, unless it has already been done;

(b) The holder of a change approval shall submit the damage tolerance data resulting from the evaluation performed in accordance with paragraph (a)(i) to the Agency, within the following deadlines, whichever occurs later, for approval:

(i) prior to an aeroplane with that change embodied being operated in accordance with Annex IV (Part-CAT) to Regulation (EU) No 965/2012; or

(ii) before 26 February 2023.

Superseded by (EU) 2021/97……

26.334 Damage tolerance data for STCs and other changes and repairs to those changes approved before 1 September 2003

Per Annex II of regulation (EU) 2021/97, in point 26.334 of Annex I of regulation (EU) 2015/640, points (a) and (b) are replaced by the following:

(a) Upon request of an operator required to comply with point 26.370(a)(ii), a holder of a change approval that was issued before 1 September 2003 shall:

(i) for changes and published repairs identified in accordance with paragraph (a)(i) of point 26.332 and paragraph (a) (iii) of point 26.332, perform a damage tolerance evaluation;

(ii) establish and document the associated damage tolerance inspection, unless it has already been done.

(b) The holder of a change approval shall submit the damage tolerance data resulting from the evaluation performed in accordance with paragraph (a)(i) to the Agency:

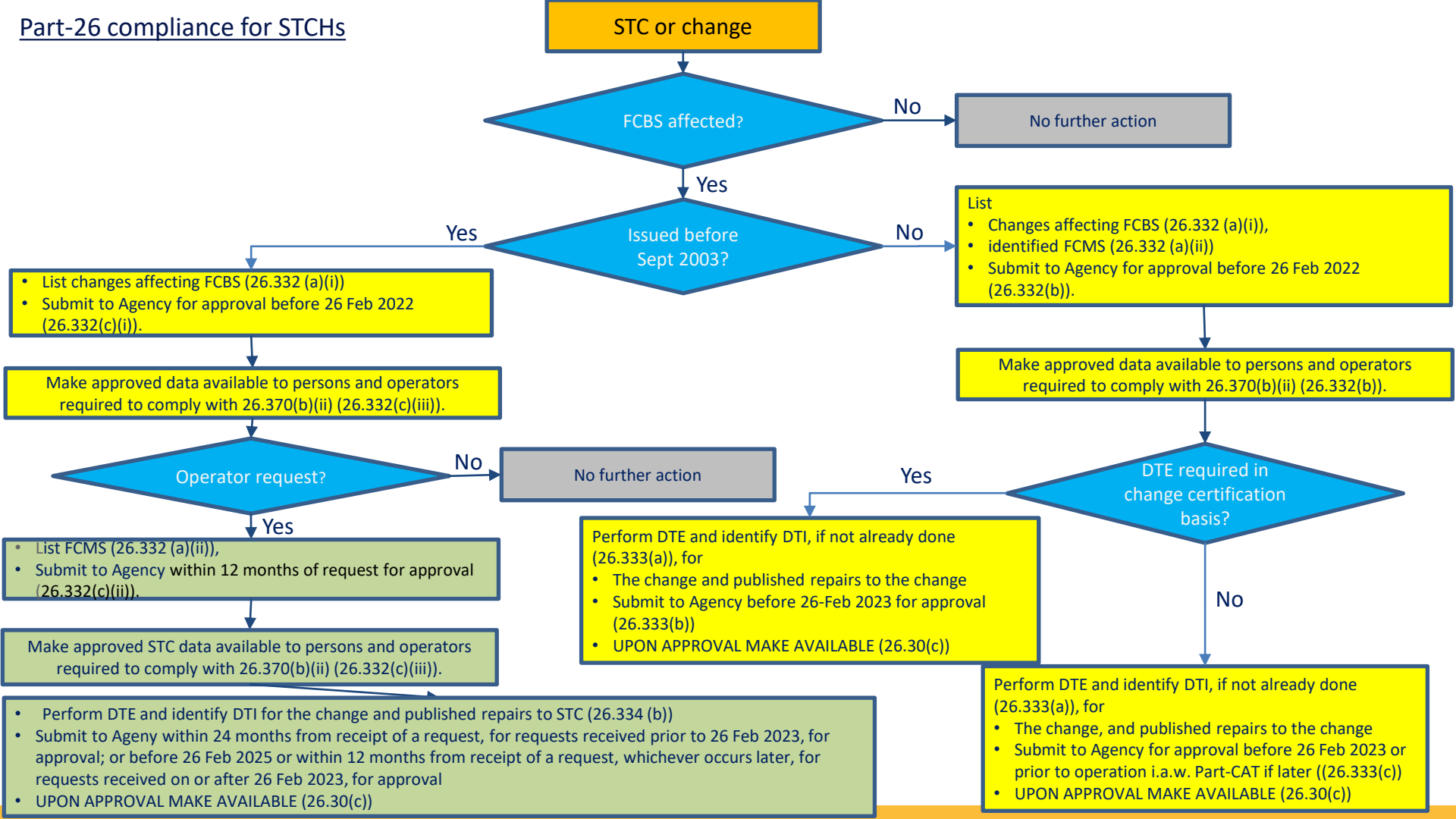
(i) within 24 months from receipt of a request, for requests received prior to 26 February 2023, for approval; or

(ii) before 26 February 2025 or within 12 months from receipt of a request, whichever occurs later, for requests received on or after 26 February 2023, for approval.'

Changes approved before 1 September 2003

- **26.332 (a)(ii), (c)(ii) and 26.334 List of FCMS and DT data for changes**
  - IF REQUESTED BY AN OPERATOR required to comply with paragraph (b)(ii) of point 26.370, the change approval holder shall
  - list FCMS for the change
  - within 12 months of the request submit the list to the Agency for approval
  - identify any published repairs to those changes
  - perform DTE of those changes and for published repairs to those changes
  - establish and document DTI for those changes
  - submit the DT data (DTE plus DTI) to the agency
  - within 24 months from receipt of a request, for requests received prior to 26 February 2023, for approval; or
  - before 26 February 2025 or within 12 months from receipt of a request, whichever occurs later, for requests received on or after 26 February 2023, for approval.
  - make approved data available to operators

Part-26 compliance for STCHs



Changes that affect FCBS

- CS 26.332(a)
- Compliance with points 26.332(a)(i) and 26.332(b) or 26.332(c)(i) of Part-26 is demonstrated when the changes affecting the FCBS are identified in compliance with AMC 20-20A Appendix 3 paragraph 4, and the list of changes has been submitted to EASA for approval.

Changes that may adversely affect FCBS

- (1) Passenger-to-freighter conversions (including addition of main deck cargo doors).
- (2) Gross weight increases (increased operating weights, increased zero fuel weights, increased landing weights, and increased maximum take-off weights).
- (3) Installation of fuselage cut-outs (passenger entry doors, emergency exit doors or crew escape hatches, fuselage access doors, and cabin window relocations).
- (4) Complete re-engine or pylon modifications.
- (5) Engine hush kits.
- (6) Wing modifications such as installing winglets or changes in flight control settings (flap droop), and modification of wing trailing edge structure.
- (7) Modified skin splices.
- (8) Antenna installations.
- (9) Any modification that affects several stringer or frame bays.
- (10) Any modification that covers structure requiring periodic inspection by the operator's maintenance programme.
- (11) Any modification that results in operational mission change that significantly changes the manufacturer's load or stress spectrum (e.g. passenger-to-freighter conversion).
- (12) Any modification that changes areas of the fuselage that prevents external visual inspection (e.g. installation of a large external fuselage doubler that results in hiding details beneath it).
- (13) In general, attachment of interior monuments to FCS. Interior monuments include large items of mass such as galleys, closets, and lavatories.

→ REF Annex 5 of AMC 20-20A Appendix 3

Identifying and listing FCMS

- CS 26.332(b)
- FCMS has been identified in compliance with AMC 20-20A Appendix 3 paragraph 4, and the list of the FCMSs clearly describing the location and the extent of the FCMSs has been submitted to EASA for approval

Identifying and listing FCMS

- CS 26.332(b)
- FCMS has been identified in compliance with AMC 20-20A Appendix 3 paragraph 4, and the list of the FCMSs clearly describing the location and the extent of the FCMSs has been submitted to EASA for approval

Using existing CFR14 Part 26 compliance data to support compliance

Part-26	CFR 14 § ?	Explanation	Comment on use of CFR 14 data
26.330	N/A	Generic compliance requirement	
26.331	26.49	Same intent for CP	CP can refer to compliance with 26.47 for DTE.
26.332	26.47(b)	FCMS/FCAS Same intent for existing STCs only.	Where approved FCAS exists it can be used directly to support compliance. For STCs approved by FAA after 11 Jan 2008 no FCAS list was required by 26.47. For compliance with 26.332 these STCs will need FCMS lists.
26.333	26.47(c)	DT data for STCs EASA approved 1 Sept 2003 onward	FAA approved DT Data can be used directly to support compliance.
26.333	26.47(d)	DT data for published repairs to STCs approved Sept 2003 onward	FAA approved DT Data can be used directly to support compliance.
26.334	26.47(c)	DT data for STCs approved before Sept 2003	FAA approved DT Data can be used directly to support compliance.
26.334	26.47(d)	DT data for published repairs to pre-Sept 2003 STCs	FAA approved DT Data can be used directly to support compliance.

EASA
European Union Aviation Safety Agency

Approval of data

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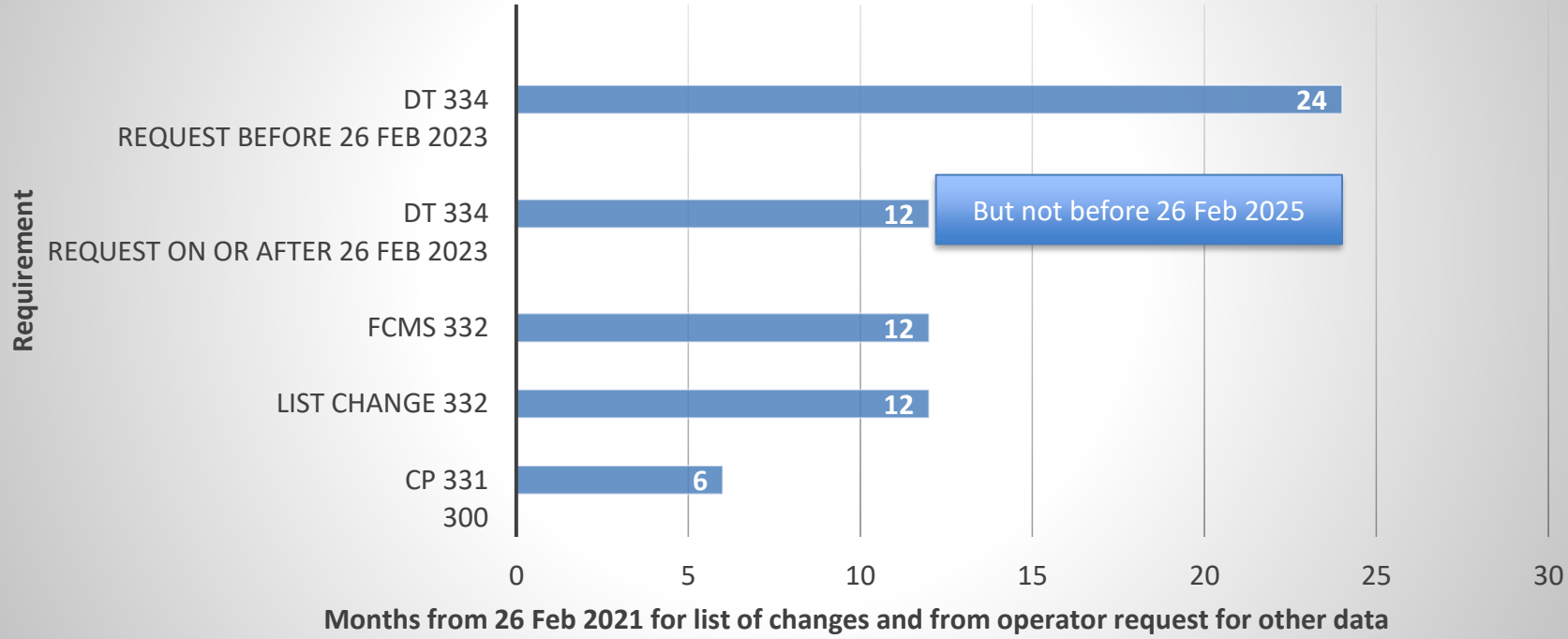
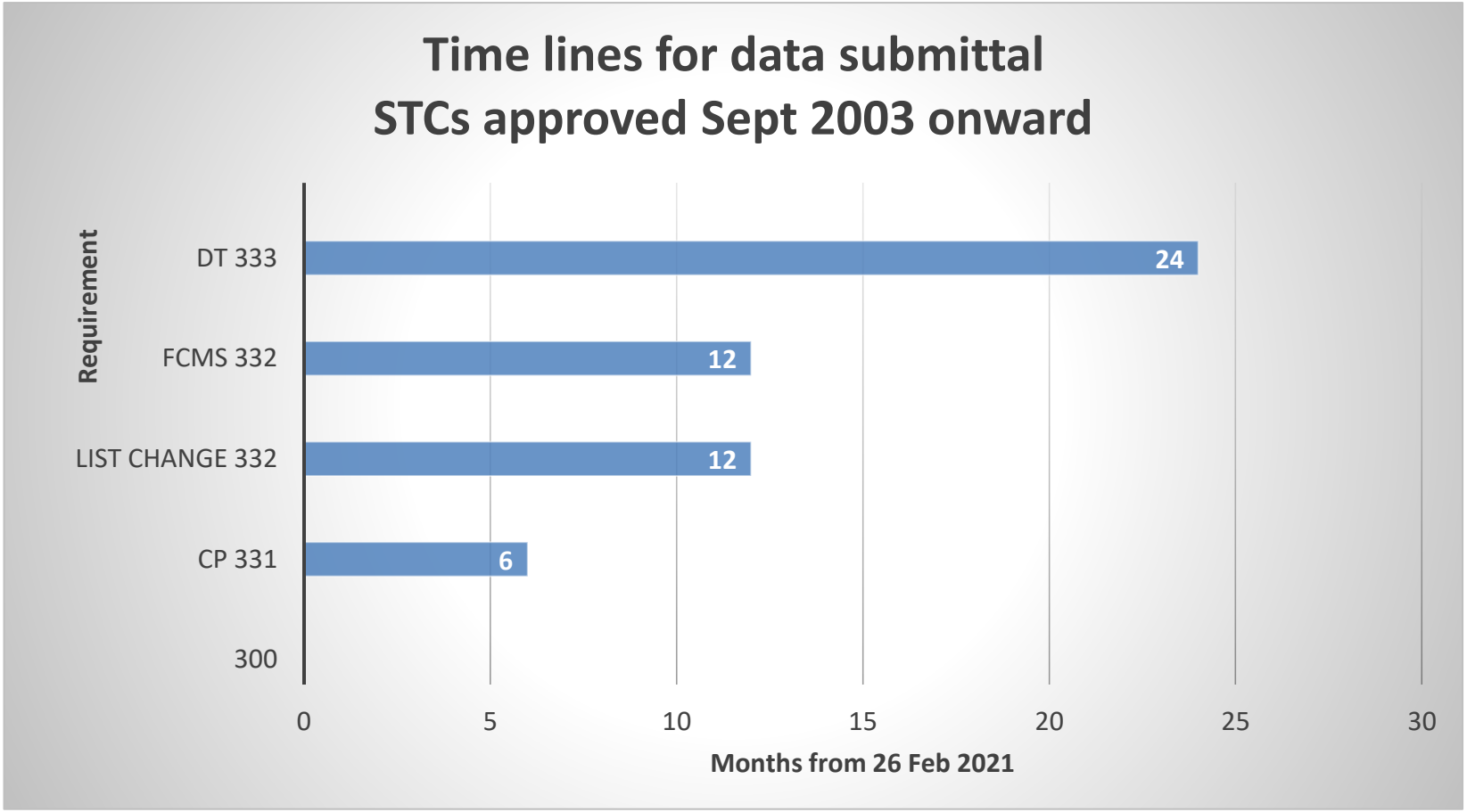
Time lines for data submittal STC approved before Sept 2003




Time lines for data submittal
STCs approved Sept 2003 onward
Requirement
DT 333
FCMS 332
LIST CHANGE 332
CP 331
300
24
12
12
6
0
5
10
15
20
25
30
Months from 26 Feb 2021

Approval of DT data

- **Change approvals issued after 1st Sept 2003**
- If no changes are required to the existing DT data; i.e. the DT data is already complete and approved under the STC as allowed under 26.333(b))
- and the DT data is already approved by EASA
- then there is no need to submit the DT data for approval (Ref. point 26.333)
- i.e. compliance is shown by the original compliance data that was accomplished in accordance with acceptable damage tolerance requirements of the applicable certification basis or a later amendment (see CS-26)
- This approach should be detailed in the CP, referencing the original DT data documentation.

Approval of DT data (2)

- **If a new DTE is required or changes are required to the existing DT data or the change approval was issued prior to Sept 2003**
- Then the data will need to be submitted to EASA for review and approval
- For non-EU STCHs, in particular for those where compliance data exists for similar requirements, e.g. DT Data approved according to CFR14 §26.47 or equivalent regulation by the state of design can be used directly to support compliance findings with points 26.333 and 26.334.
- (Note: CFR14 §26.47 does not require FCAS for future STCs i.e. after Jan 2008 so FCMS lists will need to be developed to comply with point 26.332)
- EASA anticipates delegating approvals to the aviation authority of the state of design to the maximum possible extent allowed by the respective TIPs.

Submittal of deliverables

- → Several options are being reviewed to ensure the process for compliance plan and data submittal and approval is proportionate and as efficient and cost effective as possible for STCHs and the Agency
- → Further information on how to submit compliance plans and other deliverables will be provided in the coming weeks

Next steps

→ Refer to Ageing Aircraft Structure Web Page for updates

→ https://www.easa.europa.eu/domains/aircraft-products/ageing-aircraft-structure-rule

→ Please send queries to EASA ageing aircraft mail box

→ ageing-aircraft@easa.europa.eu

→ EASA will collate and summarise Q and As from this session and make them available

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Thank you for your attention

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