

STATE OF LIBYA
MINISTRY OF TRANSPORT
CIVIL AVIATION AUTHORITY



دولة ليبيا
وزارة المواصلات
مصلحة الطيران المدني

Advisory Circular
LYCAA – AC - AIR -006 - Rev00

Additional Airworthiness Requirement
for Ageing Aircraft

Approved by:

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President of the Libyan Civil Aviation
Authority



1. PURPOSE

This Advisory Circular details the additional airworthiness requirement to be performed by Operators to ensure the continuing airworthiness of ageing aircraft.

It also requires the operators to:

- Perform inspections and records reviews of ageing airplane to obtain and implement the applicable Damage Tolerance Inspections for all modifications and repairs and;
- Incorporate the Additional Airworthiness requirements in the specific Aircraft Maintenance Programme.

2. APPLICABILITY

This Advisory Circular is applicable for ageing airplane engaging in commercial operations registered in Libya.

3. REFERENCES:

Libyan Airworthiness Regulations.

LYCAR PART – M: CONTINUING AIRWORTHINESS REQUIREMENTS

4. DUE DATE FOR THIS AC:

This Advisory Circular will enter into force on the date of its signature. Aircraft inspections and records reviews shall be performed within six (6) months of the signature date of this AC.

5. DEFINITIONS

Ageing airplane: Airplane which crossed the 20 Years of service or its Design Service Goal.

Corrosion prevention and control programme (CPCP) - is 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.

Damage Tolerant (DT) - is the attribute of the structure that permits it to retain its required residual strength without detrimental structural deformation for a period of use after the structure has sustained a given level of fatigue, corrosion, and accidental or discrete source damage.

Design Approval Holder (DAH) - is the holder of any design approval, including type certificate, supplemental type certificate or repair approval.

Design Service Goal (DSG) - is the period of time (in flight cycles/hours) established at design and/or certification during which the principal structure will be reasonably free from significant cracking including widespread fatigue damage.

Fatigue Critical Structure (FCS) - is structure that is susceptible to fatigue cracking that could lead to a catastrophic failure of an aircraft.

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.

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

Fatigue Damage - Fatigue damage is damage caused to a metal structure characterized by initiation of a crack and its subsequent propagation as a result of continuous dynamic stresses with cumulative effects in the aircraft life cycle.

Limit of validity (LOV) - is the period of time, expressed in appropriate units (e.g., flight cycles) for which it has been shown that the established inspections and replacement times will be sufficient to allow safe operation and in particular to preclude development of widespread fatigue damage.

Primary Structure - is structure that carries flight, ground, crash or pressurization loads.

Repair Evaluation Guidelines (REG) - provide a process to establish damage tolerance inspections for repairs that affect Fatigue Critical Structure.

Structural Significant Item (SSI) - A structural detail, structural element or structural assembly which is judged significant by the manufacturers because of the reduction in aircraft residual strength or loss of structural function which are consequences of its failure.

Widespread Fatigue Damage (WFD) - in a structure is characterized by the simultaneous presence of fatigue cracks at multiple points that are of sufficient size and density that while individually they may be acceptable, link-up of the cracks could suddenly occur and the structure could fail.

ICA's: Instructions for continued airworthiness.

6. GENARL REQUIREMENTS:

- 6.1 The operator has the responsibility to assess and ensure a high level of structural integrity for their fleet of aircraft, especially in the case of ageing aircraft.
- 6.2 The operator is responsible for incorporating approved DAH actions necessary to maintain airworthiness into its aircraft-specific maintenance programmes, in accordance with LYCAR Part-M (point M.A.302)
- 6.3 To ensure continuing airworthiness of ageing aircraft, owners / Operators (including private Operators) are required to comply with Applicable AD's / SB's requiring structural inspections, Supplemental Structural Inspection Document (Programme), Ageing Aircraft Repair and Modification Programme, CPCP Programme, and others Instructions for Continued Airworthiness (ICA) determined. Furth more, the operator shall ensure that approved damaged tolerance-based inspections are obtained and implemented on all repairs and modifications.
- 6.4 The operator has to revise its specific maintenance programme to address the potential adverse effects of repairs and modifications on fatigue-critical structures. The basis for achieving this for existing repairs is the implementation of the REGs supplied by the TCH and, for modifications, the data supplied by the original DAH or a third party contracted by the operator.
- 6.5 The Operator shall ensure that the dedicated staff are trained in the Continuing Structure Integrity programme for Ageing Aircraft.
- 6.6 To discharge these responsibilities, the operator shall consider performing an Inspections and records review of existing repairs / modifications and incorporate any necessary inspection requirement into its aircraft maintenance programme. This should be done with the assistance of TC/STC Holders/DA Holders. (Type Certificate Holders issue documents to guide and assist the operator in developing and updating a structural inspection programme in the AMP).
- 6.7 The Aircraft Physical Inspection and Repairs evaluation shall be performed by a Maintenance Organization approved by the Libyan Civil Aviation Authority.

7. AIRCRAFT MAINTENANCE PROGRAMME

- a) Operators or owners of turbine-powered large aeroplanes certified on or after 1 January 1958 shall ensure the continuing airworthiness of ageing aeroplanes structures by preparing the aircraft maintenance programme provided for in point M.A.302 that shall include:

- (i) for aeroplanes certified to carry 30 passengers or more, or with a payload capacity greater than 3 402 kg (7 500 lbs), an approved damage-tolerance-based inspection programme;
- (ii) for aeroplanes operated in accordance with (Part-CAT) and certified to carry 30 passengers or more or with a payload capacity greater than 3 402 kg (7 500 lbs), a means for addressing the adverse effects that repairs and modifications may have on fatigue-critical structure and on inspections provided for in point (a)(i);
- (iii) for aeroplanes certified with a maximum take-off weight (MTOW) greater than 34 019 kg (75 000 lbs) an approved LOV;
- (iv) a CPCP;

8. CONTINUING AIRWORTHINESS TASKS

8.1. APPROVED DAMAGE-TOLERANCE-BASED INSPECTION PROGRAMME (DTI):

The Operator shall incorporate into the aircraft maintenance programme (AMP) the approved damage-tolerance-based inspection programme developed by the design approval holders.

8.2. DAMAGE TOLERANCE EVALUATION OF REPAIRS AND MODIFICATIONS

The Operator Shall ensure that the adverse effects that repairs and modifications may have on FCS are addressed.

This paragraph provides guidance to operators for developing a means for addressing the adverse effects that repairs and modifications may have on FCS. The guidance explains how operators can develop an implementation plan to obtain and implement all the applicable DT data for modifications and repairs.

The plan will contain processes and timelines for operators to use, for obtaining and incorporating into their maintenance programme, DTIs that address the adverse effects of repairs and modifications.

Operators will need to determine how they will obtain the information necessary to develop the plan by considering the following conditions:

- (a) The operator processes ensure that DT data for repairs and modifications affecting FCBS have been developed and all the applicable DTIs have been incorporated into the operator's maintenance programme. If an operator is able to demonstrate that these processes have been in place and followed throughout the operational life of the aircraft for all repairs and modifications affecting FCBS, then no further action is required for existing repairs and modifications
- (b) The TCH or STCH or other DAH exists and will make the DTIs available to the operator automatically or upon request.
- (c) DTIs already exist and are available.

- (d) DTIs are not available from the TCH or STCH or other DAH;
- (e) DTIs are not available for modifications developed by organisations other than TCH or STC holders.

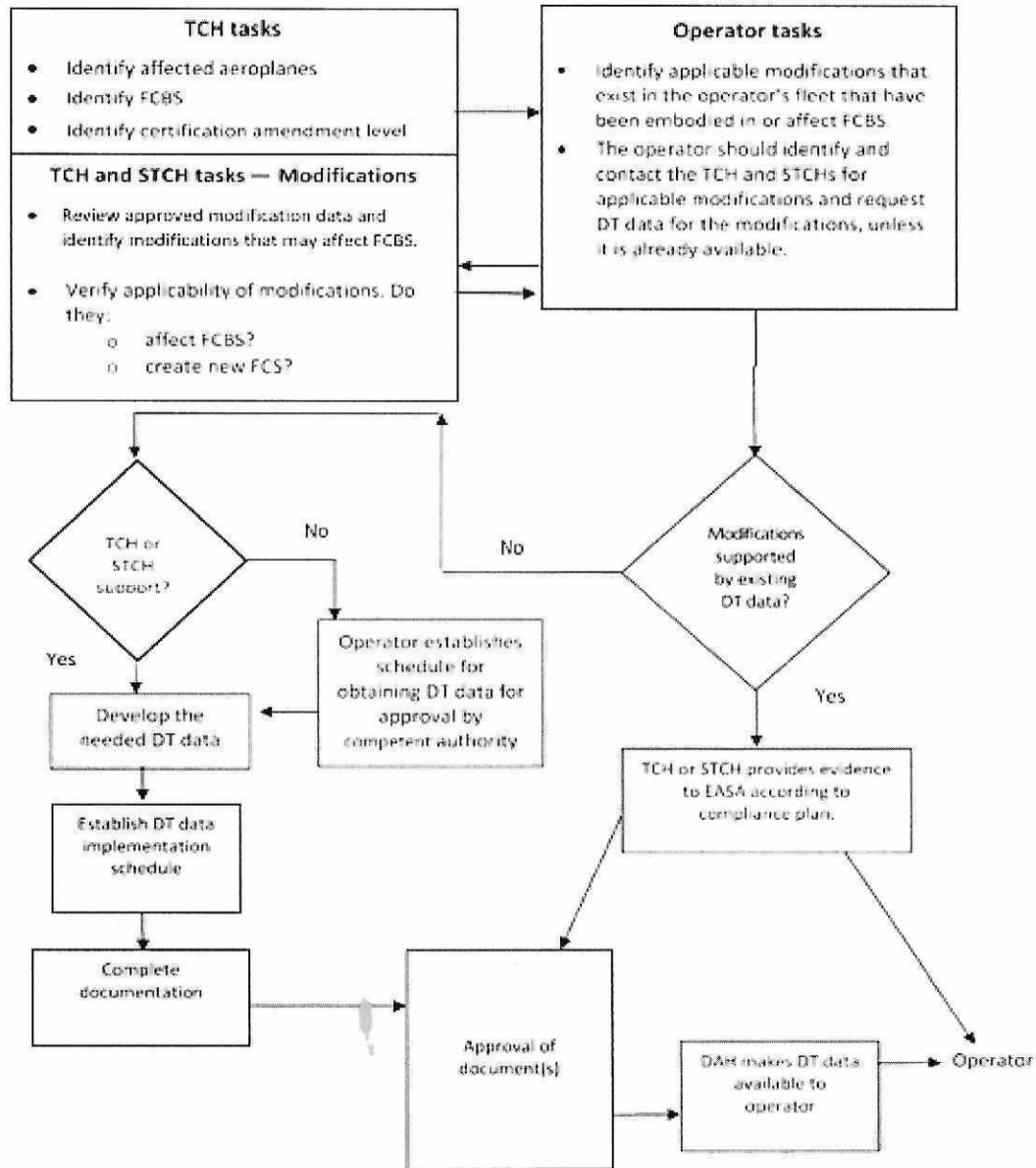


Figure 1 outlines an overview of developing a means of compliance for modifications to be addressed by STCHs/TCHs and operators

8.2.1 CONTENTS OF THE MAINTENANCE PROGRAMME

(a) The operator’s maintenance programme should contain or refer to an implementation plan that ensures that:

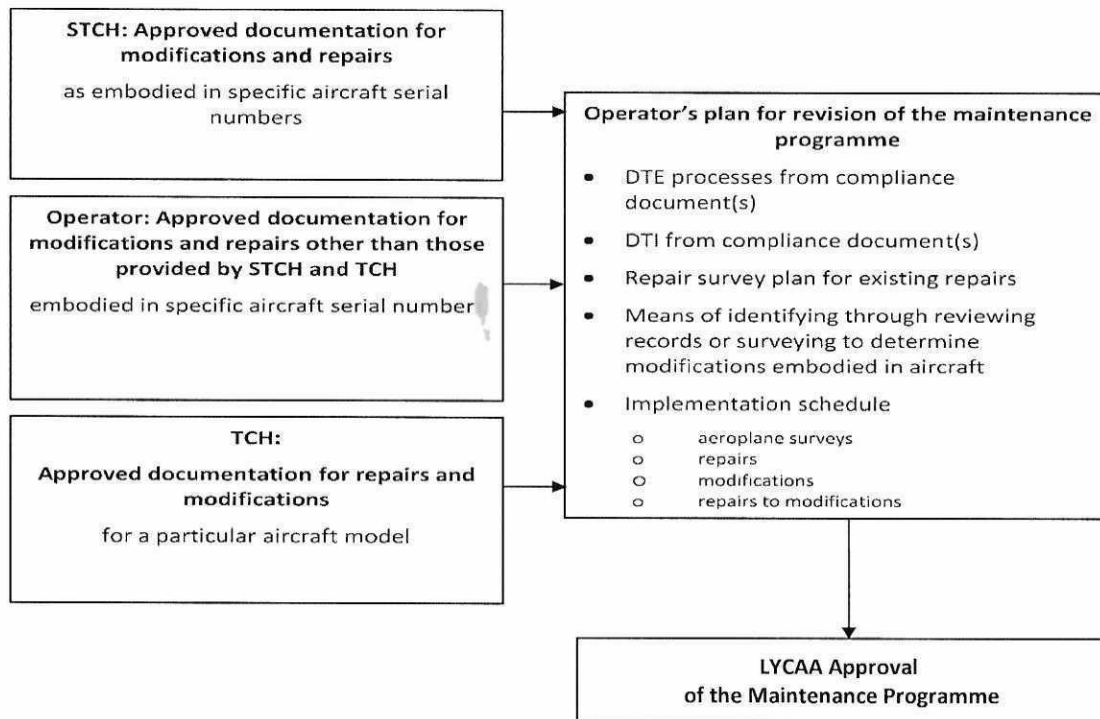
(1) all new repairs and modifications that affect FCBS will have DT data and DTI or other procedures implemented;

(2) all existing repairs and modifications to FCBS have been or will be evaluated for damage tolerance and have DTI or other procedures implemented. In the context of this implementation plan, there should be a process that:

(i) reviews operator processes to determine if DT data for repairs and modifications affecting FCBS have been developed and incorporated into the operator’s maintenance programme for the operational life of the aircraft. If an operator is able to demonstrate that these processes ensure that DT data is developed for all repairs and modifications affecting FCBS, then no further action is required for existing repairs and modifications.

(ii) identifies or inspections of existing repairs (using the applicable REGs) and modifications that affect FCBS and obtain and implement DTI for those repairs and modifications. This should include an implementation schedule that provides timing for incorporation of the DT data into the operator’s maintenance programme, within the time frame given in the applicable TCH or STCH’s approved documentation.

Figure 2 below outlines one possible means that an operator can use to develop an implementation plan for aircraft in their fleet.



8.2.2 IMPLEMENTATION PLAN FOR REPAIRS

The maintenance programme should include a repair inspection schedule to identify repairs that may need DT data developed. The TCH's REGs may be used as a basis for this plan.

8.2.3 IMPLEMENTATION PLAN AND ACTIONS FOR MODIFICATIONS

Operators are first requested to develop a list of modifications affecting FCBS through a review of the aircraft records. The operator will need to show to LYCAA that the aircraft records are a reliable means for identifying modifications that affect FCBS. The aircraft records, in conjunction with data provided by the DAH, may also be sufficient to help identify whether DTI exists for all modifications. However, for some older aircraft, a review of records alone may not always be adequate to identify all the modifications that have an adverse effect on FCBS, or be sufficient to establish whether a DTE has been accomplished and DTI is complete, without requesting such information from the DAH. Physical inspection of the aircraft may help establish the scope of the modification if it is unclear from the records. Finally, the aircraft inspection for repairs may also identify modifications affecting FCS, which should then be evaluated and DTI obtained as necessary.

(b) To support identification of modifications that need to be addressed, operators should — concurrently with the TCH and STCHs' tasks — identify the TCH or STC or other approval holder-developed modifications that exist in their aircraft fleets.

Operators should perform the following tasks:

(1) From the review of records, compile a listing of all TCH and STCH-developed modifications that are currently installed on their fleet.

(2) Delete from the listing those modifications that do not affect FCBS. Documents from the TCH may be used to identify the FCBS.

Note: In order to ensure timely compliance with this AC, operators should begin developing the list of modifications that affect FCBS, for each affected aircraft in the fleet, as soon as the TCHs make their FCBS listing available.

(3) The modifications that affect FCBS must be reviewed to determine whether:

- (i) DT data already exists in the maintenance programme, or is available and is complete; or
- (ii) DT data needs to be developed.

(4) For DT data that is complete, the operator should incorporate it into the maintenance programme and implement it according to the schedule provided or as otherwise agreed by the competent authority.

(5) For DT data that is not available or is incomplete after the date of applicability the operator should ensure that the plan developed will address each affected modification.

(6) Where DT data is not available or is incomplete, the operator should notify both the STCH or a third party that DT data for the modification is required.

(7) Establish whether the STCH or a third party will provide the data.

Note: The operator shall contact the approval holder or a third party as soon as possible after identifying a modification that affects FCBS to establish when the DTI will become available.

(8) For those modifications where the DTI will not be incorporated into the maintenance programme within 6 months from the date of applicability of this AC, the operator's DT data implementation plan should contain the following information:

- (i) a description of the modification;
- (ii) the affected aircraft and the affected FCS;
- (iii) the DSG of the affected aircraft;
- (iv) a list of the FCS introduced by the modification (if it exists);
- (v) the certification level for determining the DT data;
- (vi) a plan for obtaining DT data for each modification (e.g. reliance on the existing STCH or a formal contract with an approved third party) to produce DT data within a specified compliance time;
- (vii) a DT data implementation schedule for incorporating the DT data into the maintenance programme once it is received;
- (viii) a means of ensuring that the aircraft will not be operated beyond the time limit established for obtaining DT data.

(9) For modifications that are found during the aircraft inspection for repairs, the operator should ensure that DT data is obtained and submitted to the primary certification authority for approval. Once approved, the operator should incorporate the DTIs into its maintenance programme no later than 12 months from the date when the modification was identified.

8.2.4 Implementation of DTI

Operators should accomplish the first inspection of a change according to the approved DTI implementation schedule. If the age of the modification is unknown, the operator should use the aircraft age in total flight cycles or total flight hours, as applicable. Where there is any doubt about the applicability of the programme data or the timescales provided in the DAH documentation, Primary certification authority should be consulted by the operators and competent authority.

8.2.5 REPORTING

- a) Upon completion of the Inspection and records reviews for a specific airframe of aircraft, the CAMO manager/Head of Engineering of approved organizations who accomplished the inspections and records reviews, shall submit to LYCAA the Result of the inspection/ records review using the Form in **Annex I: RESULT OF AGING AIRPLANE SAFETY INSPECTION**.
- b) A detailed report shall be joined to the result that includes the aircraft registration number, total years in service, total flight hours and date of last inspection and records, as well as a statement that the inspection and records reviews, as applicable, is complete for that aircraft.
- c) Based on that report, LYCAA may undergo the inspection and records reviews for a specific aircraft and take the appropriate corrective actions.
- d) All minor and major defects should be thoroughly analyzed and exact reason as to the cause of the defect established. Appropriate corrective action shall be taken to ensure that the defects are not repeated and the occurrences of defects are minimized.
- e) Major defects shall be promptly reported to LYCAA and the relevant Original Equipment Manufacturer and/or Organization responsible for the Type Design.

9. LIMIT OF VALIDITY OF THE MAINTENANCE PROGRAMME AND WIDESPREAD FATIGUE DAMAGE (WFD) EVALUATION (LOV)

9.1 The Operator Shall incorporate into the maintenance programme the most restrictive applicable limitation of points (1) and (2) below, in flight cycles or flight hours or both, as appropriate:

- (1) An Approved LOV;
- (2) An Approved limitation on the applicability of the ALS of the instructions for continued airworthiness at the aeroplane level (or equivalent).

10. CORROSION PREVENTION & CONTROL PROGRAMME (CPCP)

10.1 A corrosion prevention and control programme (CPCP) is a systematic approach to prevent and to control corrosion in the aircraft's primary structure. The objective of a CPCP is to limit the deterioration due to corrosion to the level necessary to maintain airworthiness and, where necessary, to restore the corrosion protection schemes for the structure. A CPCP consists of a basic corrosion inspection task, task areas, defined corrosion levels, and compliance times (implementation thresholds and repeat intervals). The CPCP also includes procedures to notify the LYCAA and TCH of the findings and data associated with Level 2 and Level 3 corrosion and the actions taken to reduce future findings to Level 1 or better.

10.2 As per LYCAR Part M, M.A.302 the Corrosion Prevention and Control Programme (CPCP) is part of the AMP.

- 10.3 The CPCP is required for all primary aircraft structures and a baseline is developed during the MRB process. It applies to damage tolerant and safe-life structures.
- 10.4 For those aircraft whose maintenance schedule is not based on an MRB process this is covered in a separate document. The Baseline Programmes recognize three levels of corrosion that are used to assess CPCP effectiveness as the following:
- **Level 1** Corrosion found during the accomplishment of the numbered Corrosion Tasks indicates an effective programme.
 - **Level 2** Corrosion indicates that programme adjustments are necessary.
 - **Level 3** Corrosion is an urgent airworthiness concern requiring expeditious action on the part of the operator to protect its entire model fleet.
- 10.5 Operators may either develop CPCP's tailored to their operations based on the manufacturer's Baseline Programme or adopt the manufacturer's programme in total.
- 10.6 Early implementation, especially on ageing airplanes, of a CPCP is necessary to ensure that pre-existing unsafe levels of corrosion are removed from an operator's fleet.
- 10.7 LYCAA shall be notified immediately through the occurrence reporting system upon determination of Level 3 Corrosion and OEM.
- Level 2 and Level 3 Corrosion findings must be reported to the manufacturer for evaluation and possible Baseline Programme adjustment.
- 10.8 Although the CPCP is initially based on the baseline programme recommended by the TC Holder, the operator shall monitor the effectiveness of the inspection programme.
- 10.9 Inspection findings and operating/storage conditions may dictate de-escalation/adjustment of the inspection intervals and/or more intensive inspections.

11. AIRCRAFT RECORDS

The owner/operators must ensure that each aircraft have clear service history and records.

The records shall contain but not limited to as follow;

- a) Total years in service of the aircraft;
- b) Total time in service of the airframe;
- c) Total flight cycles of the airframe;
- d) Date of the last inspection and records review;
- e) Current status of life-limited parts of the airframe;
- f) Time since the last overhaul of all structural components required to be overhauled on a specific time basis;
- g) Current inspection status of the airplane, including the time since the last inspection required by the inspection programme under which the airplane is maintained;
- h) Current status of applicable ADs, including the date and methods of compliance and, if the AD involves recurring action, the time and date when this action is required;
- i) A list of major structural modifications/alterations; and
- j) A report of major structural repairs and the current inspection status for those repairs

Annex I: RESULT OF AGING AIRPLANE SAFETY INSPECTION

RESULT OF AGEING AIRPLANE SAFETY INSPECTION					
INSTRUCTIONS: Print or type all entries.					
1. Airplane	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; padding: 5px;">Make</td> <td style="padding: 5px;">Model</td> </tr> <tr> <td style="padding: 5px;">Serial No.</td> <td style="padding: 5px;">Registration Mark</td> </tr> </table>	Make	Model	Serial No.	Registration Mark
	Make	Model			
Serial No.	Registration Mark				
2. Air Carrier	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; padding: 5px;">Name</td> <td style="padding: 5px;">Address</td> </tr> <tr> <td style="padding: 5px;">Certificate No.</td> <td></td> </tr> </table>	Name	Address	Certificate No.	
	Name	Address			
Certificate No.					
3. Completion of records review and airplane inspection					
A. The airplane inspection and records review have been completed in accordance with this Advisory Circular.					
<input type="checkbox"/> Yes <input type="checkbox"/> No					
B. Have discrepancies been identified during this inspection?					
<input type="checkbox"/> Yes <input type="checkbox"/> No					
C. Attached Report					
<input type="checkbox"/> Yes <input type="checkbox"/> No					
Name					
Signature of Authorized Individual	Date				