

NEPALESE CIVIL AIRWORTHINESS REQUIREMENTS

SECTION C

MAINTENANCE REQUIREMENTS

CHAPTER C.14

STRUCTURAL INTEGRITY REQUIREMENTS FOR AGING AIRCRAFT

1. GENERAL

- 1.1 This chapter prescribes the criteria necessary for the development and implementation of a Structural Integrity Program (SIP) as set out in Chapter B.1, para.8 of the Nepalese Civil Airworthiness Requirements and it identifies the limitations where, if exceeded, an aircraft shall not be operated unless in compliance with a Structural Integrity Program.
- 1.2 National Civil Aviation Policy 2063 at article 3.3 (a), prohibits the import of aircraft which exceed 10 years of age or exceed 50% of the maximum economic design life. It also prohibits the operation of aircraft which exceeds 20 years of age or 75% of maximum design life in flight hours or cycles whichever occurs earlier as prescribed by the manufacturer (within Airworthiness Limitations approved by the State of Manufacture). Adherence to the criteria of this chapter and following Chapter C-15 (Corrosion Prevention and Control Programs) is a means of gaining permission under Article 3.3 (c) of the National Civil Aviation Policy 2063 for the purpose of operating a particular aircraft until such time as the design airworthiness limitations of the aircraft, are exceeded
- 1.3 Within this chapter where the term "Structural Integrity Program" is utilized, it shall be taken to mean those requirements, inspections and procedures identified and provided by the Type Certificate holder which may be in the form of a Structural Inspection Document, a Supplemental Structural Inspection Document, or other equivalent documents. The Structural Integrity Program shall also include any required assessments, modifications and

repairs deemed necessary by the Type Certificate holder or State of Manufacture and which may include Airworthiness Directives, Service Bulletins, or Service Letters and other instructions as deemed necessary.

2. BACKGROUND

ISSUE 1 SEPTEMBER 1996

- Service experience indicates that, as aircraft become older, they are more likely to exhibit indications of fatigue cracks, accidental damage, or corrosion. For these aircraft, a Structural Integrity Program which includes special structural inspections and modifications may be required to ensure their continued Airworthiness as service age increases. The structural inspections and modifications are usually published as Structural Inspection Documents, Supplemental Structural Inspection Documents, or under other names as decided by the aircraft Type Certificate holder. These documents are usually approved or mandated by Airworthiness Directives of the State of Manufacture.
- 2.2 With reference to para.2.1, transport aircraft of more modern design, present an exception to this approach. While still subject to the same aging processes, these aircraft are manufactured and maintained in accordance with more recent design and maintenance requirements philosophies, consequently they will have the requirements of a Structural Integrity Program already included within the approved Maintenance Review Board Document of aircraft.

3. IMPLEMENTATION

- 3.1 Subject to para.3.4, aircraft which meets the criteria of following para.3.3, the owner shall implement the requirements of a Structural Integrity Program for each aircraft, prior to application for permission to operate the aircraft or to continue to operate the aircraft under Article 3.3 (c) of National Civil Aviation Policy 2063.
- 3.2 Where permission is requested to operate under Article 3.3 (c) of Nepalese Civil Aviation Requirements, the operator shall make application to the Civil Aviation Authority of Nepal in accordance with Appendix-1 to this chapter.
- 3.3 The requirements of paragraph 3.1 preceding, are applicable for aircraft which exceed the following criteria:

- (a) all aircraft which are currently in operation and which exceed 20 years of age or 75% of the maximum design life as prescribed by the manufacturer (ref National Civil Aviation Policy 2063), whichever occurs earlier.

3.4 With reference to the requirements of para.3.1 preceding, all aircraft which have been type certificated to damage tolerant design standards and which are operated in accordance with an approved Maintenance Review Board Document that is developed in accordance with MSG-3 standards and is revised in accordance with current MSG 3 requirements, shall not be required to have a separately approved Structural Integrity Program. These aircraft are accepted on the basis that the Maintenance Review Board Document incorporates within it, a continuous structural inspection review program that meets criteria and which is approved as part of the operators base maintenance program.

3.5 Aircraft less than 5700 kilograms which do not have approved Structural Integrity Program may be permitted to operate under which National Civil Aviation Policy 2063 at article 3.3 (a), provided the operator :

- (a) replaces all structural life limited components and carries out all Corrosion Prevention and Control Program before the occurrence of paragraph 3.3 above.
- (b) applies to the Director General at least one year before para.3.3 occurs with proof and schedule of compliance of paragraph 3.5 (a) above.

4. APPLICATION PROCEDURES

4.1 For Aircraft with an existing Structural Integrity Program

- (a) The owner of an aircraft with an existing Structural Integrity Program (SIP) or other equivalent program which is contained within a document accepted or mandated by the State of Manufacture, may make application for permission under National Civil Aviation Policy 2063 at article 3.3 (c), to operate the aircraft. At the time of application, the owner of the

subject aircraft shall demonstrate that the aircraft has incorporated; the modifications, replacement parts and inspections that are required to provide adherence with the Structural Integrity Program and the approving authority or mandating Airworthiness Directive. Where such an application is made, it shall be in the Form C.14.1 as detailed in Appendix -1 to this chapter.

- (b) The owner of an aircraft which is designed and type certificated to damage tolerant principles and for which a corresponding Maintenance Review Board (MRB) Document has been developed and kept current in accordance with the procedures of ATA Maintenance Program Development Document MSG-3 and FAA AC 121-22A (Maintenance Review Board Procedures), may make application for permission to operate the aircraft under National Civil Aviation Policy 2063 at article 3.3 (c). At the time of application, the owner shall show compliance with the maintenance program as detailed by the Maintenance Review Board and shall have incorporated all additional Airworthiness Directives, modifications, repairs and instructions affecting Structural Airworthiness which are issued by the Type Certificate holder and the State of Manufacture. Where such an application is made, it shall be in the Form C.14.1 as detailed in Appendix -1 to this chapter.

4.2 For Aircraft which do not have an existing Structural Integrity Program

- (a) Subject to para.4.2 (b) and (c) of this paragraph, for those aircraft subject to the criteria of the foregoing para.3.3, where a Structural Integrity Program (SIP) or other equivalent that is contained within a document accepted or mandated by the State of Manufacture does not exist, the owner of such aircraft shall not operate the aircraft beyond the limits of National Civil Aviation Policy 2063 at article 3.3 (a) or (b) as applicable.
- (b) Where a Structural Integrity Program does not exist and the Director General has required an aircraft Type Certificate holder to provide a Structural

Integrity Program, the Type Certificate holder shall publish and provide the program within a document in accordance with the criteria of paragraph 5 following .

- (c) Where the Type Certificate holder publishes the Structural Integrity Program, the program shall be accepted or mandated by the State of Manufacture. Where the State of Manufacture declines to accept or mandate the Structural Integrity Program, the requirements of preceding paragraph 4.2 (a) above shall apply.
- (d) Where a Structural Integrity Program has been developed and published in accordance with para.5 following, the program shall be reviewed and accepted by the Director General, who may mandate it by Airworthiness Directive, prior to use. Where such a document has been mandated by ADs, the aircraft owner may make application for permission to operate the aircraft in accordance with preceding paragraph 4.1 (a).

5. DEVELOPMENT OF A STRUCTURAL INTEGRITY PROGRAM

- 5.1 Program Development: Where a Structural Integrity Program is to be developed, it shall be developed in accordance with the general guidelines of ICAO Document 9642-AN/941 (Continuing Airworthiness Manual). The methods, principles and data underlying the continuing assessment of structural integrity and the development of a continuing Structural Integrity Program are activities which are required to be undertaken by the Type Certificate holder who shall make them available for review by the Director General. The development procedure for a Structural Integrity Program shall include the following elements:

5

- (a) a recognized process for the continuing assessment of aircraft structural integrity by the Type Certificate holder,
- (b) a continuing Structural Integrity Program, which implements those inspections, modifications, and repair design assessments which are identified by sub paragraph 5.1 (a) and which are necessary for the continued safe operation of the aircraft,
- (c) publication of a document which contains the continuing Structural Integrity Program of para.5.1 (b) preceding, and
- (d) an accepting or mandating statement by the State of Manufacture, which makes implementation of the Structural Integrity Program mandatory.

5.2 Continuing Assessment of Aircraft Structural Integrity

- (a) The Type Certificate holder shall be responsible for conducting a continuing assessment of the structural integrity of the aircraft to which the Type Certificate pertains, throughout the aircraft's operational life. Where a continuing assessment is undertaken the following shall be taken into account; the original design objectives and assumptions, the current advancements in technology, and the known behavior of the aircraft structure while in service. The following information shall be included in the assessment and kept in a form available for reference;
 - (i) the current operational statistics of the fleet in terms of hours or flights,
 - (ii) the typical operational mission or missions assumed in the assessment,
 - (iii) the structural loading conditions from the chosen missions, and
 - (iv) supporting test evidence and relevant service experience.

6

In addition, the following information shall be included for each critical part or component reviewed as part of the assessment;

- (1) *the basis employed for evaluating the damage tolerance or safe-life characteristics of the part or component,*
 - (2) *the site or sites within the part or component where damage could affect the structural integrity of the aircraft,*
 - (3) *the recommended inspection methods for the area and the minimum detectable size of damage,*
 - (4) *for damage-tolerant structures, the maximum damage size at which the required residual strength capability can be demonstrated and the critical design loading case for the latter,*
 - (5) *for damage-tolerant structures, at each damage site the inspection threshold and the damage growth interval between detectable and critical, including any likely interaction effects from other damage sites, and*
 - (6) *information related to any variations found necessary to safe-lives already declared for parts and components.*
- (b) The Type Certificate holder shall also be responsible to involve the operators of the aircraft when developing the Structural Integrity Program and when amending it.
 - (c) The Type Certificate holder shall publish the details of a reporting program which details how operators shall collect and report the data concerning operational usage, structural discrepancies, aircraft modification status, and aircraft history.
 - (d) The methods, principles and data underlying the continuing assessment of structural integrity and the development of the Structural Integrity Program shall be available for review by the Director General.

5.3 The Structural Integrity Program

- (a) The Type Certificate holder shall identify those structural parts and components which contribute significantly to carrying flight, ground, pressure or control loads and whose failure could affect the structural integrity necessary for the safety of the aircraft.
- (b) The Type Certificate holder shall perform analysis of those parts and components in paragraph 5.3 (a) sufficient to establish inspection thresholds, inspection frequency, and where appropriate retirement life for each part and component.
- (c) The effect of repairs and modifications made by the Type Certificate holder shall be included in the analysis of para.5.3 (b).
- (d) With reference to para.5.3 (b), the effectiveness of the analysis shall be checked periodically, against the current world fleet service experience and the time frames for such periodic analysis shall be included in the Structural Integrity Program. Where unexpected defects arise, further analysis shall be undertaken and the results included within the Structural Integrity Program.
- (e) The Structural Integrity Program shall contain all of the requirements for the inspection procedures and for the replacement or modification of parts or components necessary for the continued safe-operation of the aircraft. The Structural Integrity Program shall also include the following:
 - (i) identification of the variants of the basic aircraft type to which the program relates,
 - (ii) a summary of the operational statistics of the fleet in terms of hours or flights and description of the typical mission or missions,

- (iii) reference to documents giving any existing inspections, or modifications of parts and to existing structural Service Bulletins which may still need to be applied, in addition to those given in the program and
- (iv) the types of operations for which the inspection is considered valid.

In addition, for components and parts the Structural Integrity Program shall address the following;

- (1) *a description of the part or component and any relevant adjacent structure including a means of access to the part or component,*
- (2) *the type of damage which is being considered (fatigue, wear, environmental, accidental)*
- (3) *service experience and Service Bulletins which are relevant,*
- (4) *the likely sites of damage,*
- (5) *required inspection method and procedure and alternatives,*
- (6) *minimum size of damage considered detectable by the methods of inspection,*
- (7) *guidance to the operator on which inspection findings should be reported to the manufacturer,*
- (8) *required initial inspection threshold,*
- (9) *required repeat inspection interval,*
- (10) *reference to optional modifications or replacement of part or component as inating action to inspection*
- (11) *reference to a mandatory modification or replacement of the part or component at a given life if a fail-safe inspection is impractical,*
- (12) *information related to any variations found necessary to safe-lives already declared.*

7. REVISIONS TO STRUCTURAL INTEGRITY PROGRAM

7.1 Aircraft Manufacturer Responsibility

It shall be the responsibility of the Type Certificate holder to maintain a program concerning the continuing assessment of structural integrity. As such the Type Certificate holder will from time to time publish revisions to the document which contains the Structural Integrity Program which shall be accepted or mandated by the State of Manufacture.

7.2 Operator Responsibility

Where the Type Certificate holder has issued a revision to a Structural Integrity Program, the revision shall be implemented within all applicable aircraft by the operator of those aircraft in accordance with the implementation time frames set by the Type Certificate holder and as mandated by the State of Manufacture or the Director General.

Civil Aviation Authority of Nepal.

Form C.14.1

Appendix- 1

APPLICATION FOR PERMISSION TO OPERATE UNDER ARTICLE 3.3(c) OF NATIONAL CIVIL AVIATION POLICY 2050

- 1) With respect to an application under this part, the applicant shall complete boxes numbered 1 through 13 of the Form C.14.1 as shown on this Appendix. The applicant shall include with the application the documents as specified in box 11A or 11B as applicable. The application on completion, shall be submitted to the Airworthiness Division, Aviation Safety Directorate, Civil Aviation Authority of Nepal, Kathmandu.
- 2) When the application is received in the Airworthiness Division an authorized person will be assigned to process the application. He will perform the necessary actions and judgments as indicated in boxes 13 through 18. This work will include a review and audit as described in box 16. In addition he will perform the required actions to verify that a CPCP program has been implemented for the applicant aircraft.
- 3) If the review is satisfactory the Airworthiness Division will generate a letter to the Director General recommending that the applicant be granted permission to operate under article 3.3 c) of the Policy 2050.
- 4) Where the review is not satisfactory, the authorized person shall document the reasons and generate a letter to the Director General recommending that the application should be declined and state the reasons.
- 5) Where deficiencies are correctable, the applicant will be given opportunity to correct them.

Note: This application is to be processed in conjunction with the activities required under Chapter C.15 concerning the implementation of an effective Corrosion Prevention and Control Program.

CIVIL AVIATION AUTHORITY OF A NEPAL	
Application: For Operation of an Aircraft Pursuant to Article 3.3 (c) National Civil Aviation Policy 2051	1) Date: _____
2) Name of Aircraft Operator: _____ _____ _____	3) Aircraft Manufacturer _____ _____ _____
4) Aircraft Model and Series _____ _____ _____	5) Date of Manufacturer _____
6) Nepalese Type Certificate No. _____	7) Total Time in Service _____
8) Total Flight Cycles _____	9) Max. Certificated T/O Weight _____
10) Type of Operation _____	11) With reference to Nepalese Civil Aviation Requirements Chapter C.14, please indicate under which of the following two clauses this application is pursuant to:
11A) Clause 4.1 (a) "The applicant aircraft is currently subject to an existing Structural Integrity Program which has been accepted or mandated by the State of Manufacture" Note: The applicant shall provide a copy of the current Structural Integrity Document	11B) Clause 4.1 (b) "The applicant aircraft is type certificated in accordance with damage tolerance principles and there exists a current Maintenance Review Board Document which has been developed and kept current in accordance with MSG-3 Philosophy" Note: The applicant shall provide a copy of the current Maintenance Review Board Document, and the

and the mandating or accepting statement of the State of Manufacture with this application.	current Policy and Procedures Handbook utilized to manage the MRB Document as part of this application.						
12) Name of person authorized to make this application: _____ _____	13) Signature of authorized person making this application and who is attesting to the accuracy of the foregoing information: _____ _____						
For Official Use Only: The following sections are to be reviewed and filled out by the Airworthiness Division whose name appears at the bottom of this form.							
14) All required information is entered on this Form ?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: right;">Yes</td> <td style="width: 10%; text-align: right;">No</td> <td style="width: 80%;"></td> </tr> <tr> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> </tr> </table>	Yes	No		_____	_____	_____
Yes	No						
_____	_____	_____					
15) All requested documents have been provided with this application?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: right;">Yes</td> <td style="width: 10%; text-align: right;">No</td> <td style="width: 80%;"></td> </tr> <tr> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> </tr> </table>	Yes	No		_____	_____	_____
Yes	No						
_____	_____	_____					
16) Is the applicant aircraft eligible for permission to operate under article 3.3 (c) of National Civil Aviation Policy 2050 ?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: right;">Yes</td> <td style="width: 10%; text-align: right;">No</td> <td style="width: 80%;"></td> </tr> <tr> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> <td style="text-align: right;">_____</td> </tr> </table>	Yes	No		_____	_____	_____
Yes	No						
_____	_____	_____					
17) If yes to 14, 15 & 16 above, then the existing aircraft maintenance records, maintenance schedule, and aircraft shall be audited to establish conformity with the required modifications, ADs, SBs and Inspection requirements for the aircraft prior to proceeding to box 18.							
18) The forgoing information, documents and audit as required by section 16) have been completed and the aircraft as identified above is acceptable to receive permission under article 3.3 (c) for peration. Signature of reviewing person : _____ Date: _____							

