Referenced to Nigeria Regulations

NIGERIA CIVIL AVIATION AUTHORITY
NCAA

Advisory Circular

NCAA-AC-AWS014

2nd Sept 2023

MODIFICATIONS AND REPAIRS

1.0 PURPOSE

This Advisory Circular (AC) is issued to provide guidance to operators by setting acceptable means for ensuring that modifications or repairs to aircraft comply with the requirements of the applicable Regulations.

2.0 REFERENCE

2.1 Regulation 5.1.1.2 of the Nigeria Civil Aviation Regulations.

2.2 Regulation 5.7.1.1, 8.3.1.11, 9.4.1.11 of the Nigeria Civil Aviation Regulations.

3.0 GUIDANCE AND PROCEDURE

3.1 General Information:

3.1.1 This AC applies to all types and classes of aircraft for which a Type Certificate or equivalent document has been issued, and it includes all associated systems and components of the aircraft such as engines, propellers and equipment.

3.1.2 An applicant for the embodiment of a major modification or repair approval should make a formal request to the Authority on the appropriate form including, but not limited to, the following information:

a) All supporting data from the State of Design;

b) Reason for the modification – briefly state the reason;

c) Detailed description of the proposed modification;

d) A master drawing list detailing the individual drawings and specifications which define the modification;

e) Drawings and instructions necessary for the installation of the modification;

f) Submission of approved Maintenance Schedule amendment;

g) Testing procedures or methods to meet certification and operating rules, such as flammability, carbon monoxide, and noise requirements;

h) Test procedures, to ensure that they include all tests necessary to substantiate that the modification meets applicable certification requirements and are appropriate to the modification;

i) Flight test requirements: Performance and handling test requirements/flight test of radios; and

j) Any other factors affecting safety or airworthiness.

3.2 The Request for Major Modification and Repair Data Acceptance Form: AC-AWS 014 in duplicate and the attached documents shall be:

a) Submitted to the registry unit of the Director General of Civil Aviation.

b) The assigned inspector will evaluate the application using Checklist CL:0-AWS014 and shall recommend for acceptance/non-acceptance of the application:

- If the Form with its attachments are found unacceptable by the Authority, they will be returned to the applicant with a formal letter, with the details of the reasons for non-acceptance.
- If the Form with its attachments are found acceptable by the Authority, one copy of the accepted Form will be returned to the applicant allowing them to proceed with the proposed modification or repair.

3.3 Upon completion of the modification or repair, details of the work carried out must be entered on the Major Repair and Modification Record Form: AC-AWS014A which shall be submitted to the Authority within seven (7) days of the completion of the embodiment of the modifications/repair and a copy of which shall form part of the operators records and shall be made readily available for inspection by the Authority when required.

4.0 CLASSIFICATION OF MAJOR OR MINOR MODIFICATION/REPAIR

4.1 For the purpose of approving a minor design change and repair within its scope of approval, air operator/CAMO is to establish procedures and processes to determine whether the change and repair is major or minor. Further guidance can be found in Appendix A and Appendix B of this AC.

Should you require further information do not hesitate to contact:

The Director General, Civil Aviation
Nigeria Civil Aviation Authority

APPENDIX A

CRITERIA FOR THE CLASSIFICATION OF MAJOR AND MINOR MODIFICATIONS

The following criteria can be used to determine whether a modification is major or minor. For each Issue, it must be determined whether or not the proposed change will appreciably affect the aircraft. The questions require a "yes" or "no" responses. An affirmative answer to any individual question indicates that the changes should be classified as major.

Organisations are encouraged to develop their own internal checklist to determine the major and minor classifications in view of its scope of approval. When there is a doubt to the classification of change, NCAA should be consulted for clarification via their NCAA' point of contact.

Criteria for the classification of major and minor modifications			
Instruction: Insert a tick (√) if the criteria is Yes or No. If the criteria is not applicable, fill in "NA".			
No	Criteria	Yes	No
1	General		
	a) Is the change being accomplished as an alternative means of compliance with an airworthiness directive or equivalent?		
	b) Does the change affect type approval status?		
2	Mass and balance		
	a) Does the change involve a revision in the approved mass limitations or centre of gravity range limits?		
	b) Does the change require the installation of ballast or use of other methods to maintain the centre of gravity within the approved limits?		
3	Performance and flight characteristics		
	Does the change involve alterations to the configuration of the aircraft which may:		
	a) increase drag;		
	b) alter the thrust or power;		
	c) affect stability or controllability;		
	d) induce flutter or vibration; or		
	e) alter the stalling characteristics to an extent which necessitates analysis or test?		
4	Structural strength		
	a) Does the change involve a principal component of the aircraft structure such as a frame, stringer, rib, spar or stressed skin?		
	b) Does the change involve a structural element which is addressed as part of a damage tolerance or fatigue/failsafe evaluation?		
	c) Is a pressure vessel penetration or change involved?		
	d) Does the change involve the installation of an item of mass necessitating structural re-evaluation?		
	e) Does the change involve the installation or alteration of a containment or restraint system intended for the stowage of items of significant mass		
	f) Does the change involve modifications to the load-bearing structure of seats, harnesses or their means of attachment or any other occupant restraint equipment?		
	g) Does the change involve the substitution of materials?		

5	Engine operation		
	a) Does the change significantly affect the engine or propeller or their accessories?		
6	Other qualities affecting airworthiness		
	a) Does the change involve equipment for which there is no performance standard which has been approved or accepted by the airworthiness authority?		
	b) Does the change affect the probability of failure conditions that could impair or preclude continued safe flight or landing?		
	c) Does the change affect the pilot's visibility or impair the pilot's capability to control the aircraft?		
	d) Does the change involve alterations to the interior arrangement or cabin materials?		
	e) Does the change involve systems for cabin pressurization or the provision of breathing oxygen?		
	f) Does the change involve flight controls or autopilot functions of the aircraft?		
	g) Does the change involve critical- or essential components of the electrical system such as generators, alternators, inverters, batteries, distribution buses, or bus protection and control devices?		
	h) Does the change affect instruments or indicators or their subsystems that provide navigation information?		
	i) Does the change affect instruments, indicators or their subsystems that provide essential or critical information concerning the aircraft status?		
	j) Does the change affect a regulated placard?		
	k) Does the change affect any approved information contained in the flight manual or relevant document?		
	l) Does the change alters the airworthiness limitations or the operating limitations?		
	m) Does the change requires an adjustment of the type-certification basis (such as special condition, equivalent safety finding, earlier certification specification, etc)?		
	n) Is the demonstration of compliance using methods that have not been previously accepted as appropriate for the nature of the change to the product or for similar changes to other product designed?		
	o) Do the change introduces or affects functions where the failure effect is classified catastrophic or hazardous		
7	Other qualities affecting environmental characteristics		
	a) Does the change alter the aircraft noise or emission characteristics?		
8	Non-standard practices		
	a) Does the change involve practices or techniques which are novel or unproven in the proposed application?		
9	Software criticality		
	a) Does the change have a significant impact on flight operation?		

Note: Criteria stated above should vary according to the scope of approval. The considerations should not be limited to those stated above but it must cover the areas as defined in the major modification's definition.

APPENDIX B

CRITERIA FOR THE CLASSIFICATION OF MAJOR AND MINOR REPAIRS

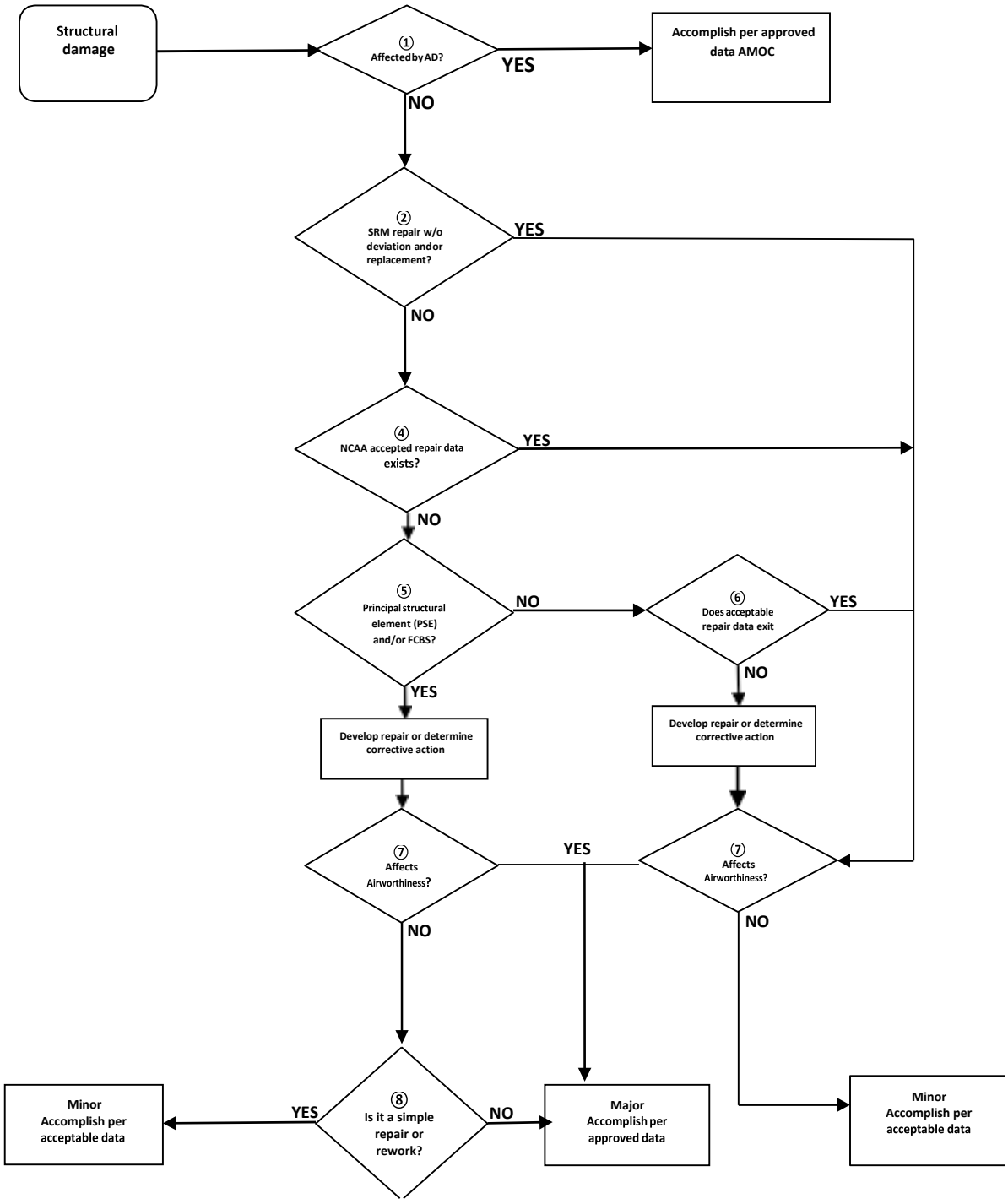
The following criteria can be used to determine whether a repair is major or minor. For the repair proposed, considerations must also be taken whether or not the repair will appreciably affect the other systems. The questions require a "yes" or "no" responses. An affirmative answer to any individual question indicates that the repair should be classified as major.
Organisations are encouraged to develop their own internal checklist to determine the major and minor classifications in view of its scope of approval. When there is a doubt to the classification of change, NCAA should be consulted for clarification via their NCAA' point of contact.

	Criteria for the classification of major and minor repairs		
	Instruction: Insert a tick (√) if the criteria is Yes or No. If the criteria is not applicable, fill in "NA".		
No	Criteria	Yes	No
1	General		
	a) Does the repair requires a re-assessment and re-evaluation of the original certification substantiation data to ensure that the aircraft still complies with all the relevant requirements?		
2	Mass and balance		
	a) Does the repair involve a revision in the approved mass limitations or centre of gravity range limits?		
3	Performance and flight characteristics		
	a) Will the repair affect the configuration of the aircraft in terms of stall characteristics, handling qualities, vibrations, aircraft performance and drag?		
4	Structural strength		
	a) Does the repair requires a re-work of the principal component of the aircraft structure (i.e. frame, stinger, rib, spar or stress skin) that necessitates a reevaluation of the damage tolerance and fatigue analysis and/or testing or it needs methods, techniques or practices that are unusual?		
	b) Does the repair affect a life limited or critical part?		
	c) Does the repair requires a re-work of the load-bearing structure of seats, harness or their means of attachment or any other occupant restraint equipment?		
	d) Will the repair change the load path and/or load sharing?		
5	Other qualities affecting airworthiness or environmental characteristics		
	a) Does the repair have an impact on the operation of the aircraft or other associated systems, including the effect on system redundancy?		
6	b) Does the repair significantly affect the engine or propeller or their accessories?		
	c) Does the repair requires a re-work or re-routing of the critical or essential components of the electrical system?		
	b) Does the change affect the probability of failure conditions that could impair or preclude continued safe flight or landing?		

	c) Does the change affect the pilot's visibility or impair the pilot's capability to control the aircraft?		
	d) Does the repair has a change to noise and emissions of the aircraft?		
	e) Does the repair change the fire protection or resistance?		

Note: Criteria stated above should vary according to the scope of approval. The considerations should not be limited to those stated above but it must cover the areas as defined in the major repair's definition.

MAJOR/MINOR REPAIR LOGIC DIAGRAM



The following notes correspond to the circle notes on the logic diagram:

1. If the damage or repair, no matter how minor, affects compliance to an Airworthiness

Directive (AD), then NCAA approval is required.

2. Repair per SRM or replace damaged part with the drawing specified or an approved equivalent part.

4. Existing State of Design approved data may include:

- Approved Service Bulletin Repair
- Design Organization approved repair instructions applicable to subject airplane.
- Repair previously approved

5. Aircraft SRM for each model type may have a listing of Principal Structural Elements (PSE) and Fatigue Critical Baseline Structure (FCBS).

6. Acceptable repair data may include:

- AOL - All Operator Letter
- AML - Airplane Modification Letter
- SL - Service Letter
- AMM - Aircraft Maintenance Manual
- CMM - Component Maintenance Manual
- OHMM - Overhaul Maintenance Manual
- SOPM - Standard Overhaul Practices Manual
- Previous Original Equipment Manufacturer (OEM) communication (with structurally acceptable/satisfactory statement or Repair and Deviation Record (RDR)).

7. The repair (as installed) has a significant effect on:

- Systems Performance – Structural repairs to any element of a system or adjacent to a system should be assessed for possible effects on the intended operation of the complete system.
- Structural Performance – Repairs to any elements of the structure should be assessed for their effect upon the structural performance of the airframe. Structural performance includes static strength, fatigue, damage tolerance, flutter and stiffness characteristics.
- Weight and Balance – The effects to be considered are related to overall aircraft CG and aircraft load distribution. Some control surfaces are particularly sensitive to changes that may affect stiffness, mass distribution and surface profile.
- Aircraft Performance – Repairs that may affect stall characteristics, handling characteristics, or performance lift/drag.

8. Simple repair/rework: blend out, oversizing, replacement, allowable damage extension, partial depth scarfing for composite repairs

Documentation required:

- OEM confirmation that condition is structurally acceptable or within certification limits, or;
- Analysis that shows the condition meets certification limits and is in compliance with Certification Standards.

Note: For non-reinforcing repairs to Fatigue Critical Structure (FCS), operators may submit a request to the aircraft manufacturer who will in turn evaluate and determine if it is acceptable based on below diagram.

MAJOR/ MINOR MODIFICATION LOGIC DIAGRAM