



CIVIL AVIATION PUBLICATION

CAP 30

MODIFICATIONS & REPAIRS

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MODIFICATIONS & REPAIRS

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Bahrain CAA Publication Revisions Highlight Sheet

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The following pages have been revised to Revision 01 dated 29 March 2017.

Item	Paragraph number	Page(s)	Reason
1	INDEX	i	New sections (Section 2, 5, 6, 8, 9, 10, 12 and Appendix 1) incorporated. Section 1 Paragraph 1.3 (Repairs – General) has been added. Sections and paragraphs re-numbered.
2	-	All pages	'CAA' wording has been changed to the "BCAA" in all related pages.
3	1.1	1	'Repairs' wording is added.
4	1.2	1	New paragraph added.
5	1.3	1	New paragraph (Repairs – General) added to include requirement of approval of modification/repair data by the State of Design.
6	1.5	2	Added 'repairs' wording.
7	Section 2	2	New section 2 (Definition) added.
8	Section 3	3-7	Section and paragraph numbering changed.
9	3.1	3	Editorial amendment.
10	Section 4	7	Editorial amendment. Section is re-numbered.
11	Section 5	7	New section (Major Repair Category) added.
12	Sections 6 & 7	8	New section 6 (Minor Repair Category) added. Section 7 re-numbered.
13	Sections 8, 9 & 10	9-10 & 12	New sections added.
14	11.1 to 11.3	12-13	Paragraphs amended & re-numbered. 'Repair' or 'repairs' wording added.



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Item	Paragraph number	Page(s)	Reason
15	11.2	13	Reference to Form ALD/AIR/F023 added.
16	Section 12	14-15	New section added.
17	Appendix 1	APP 1-1	Form ALD/AIR/F023 added as Appendix.



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1. INTRODUCTION

1.1 Purpose

The purpose of this Civil Aviation Publication is to provide guidance to Bahraini operators for making application for the processing of modifications and repairs to Bahrain registered aircraft and components.

All modifications and repairs must be carried out by a BCAA Approved Maintenance Organisation based on modifications/designs from approved ANTR 21 organisation, or a Part 21 design organisation acceptable to the BCAA.

The primary reference is ANTR 21, Subpart M and the associated AMC/GM.

The applicant for any modification/repair must have a sound knowledge of the design principles embodied in the aircraft type being modified or repaired.

1.2 Modifications – General

After issuance of an initial or original type certificate, there are many activities that can be performed or required by the type certificate holder, the State of Design, the State of Registry, air operators and other design organizations that will result in the modification of an aeronautical product. For example, the type certificate holder may want to develop a model derivative of the same aeronautical product, or an operator may want to replace an aircraft's existing navigation systems with state-of-the-art technology.

Modifications are intended to change a function, operation, limitation, performance, and/or characteristic of the physical or functional element(s) of an existing aircraft, engine, and/or propeller for the purpose of achieving a desired feature, role or capability for the affected aeronautical product. Modifications will vary in design philosophy, application technology, complexity, and magnitude.

1.3 Repairs – General

An aircraft may experience accidental damage, wear and tear, environmental deterioration, fatigue, malfunction, and failure during its operational life. A repair is a corrective action intended to restore an aeronautical product to an airworthy condition as defined by the appropriate airworthiness requirements and is regarded primarily as a maintenance function. An unapproved repair design could render a Certificate of Airworthiness invalid.

Accomplishing a repair on an aircraft may involve such actions as performing maintenance or servicing procedures, replacing a defective part with a like serviceable unit or with an approved substitute part, or designing and incorporating a repair scheme. Generally, the documents encompassing the Instructions for Continuing Airworthiness (ICA) such as, but not limited to, maintenance manuals, servicing instructions, overhaul manuals and repair manuals contain adequate maintenance procedures that are recognized by the BCAA as either approved or acceptable for purposes of accomplishing repairs to aircraft. For example, a structural repair manual (SRM) contains several State of Design approved repair schemes for typical damages or structural failures that can be readily applied by an operator, without the need to obtain prior approval of the BCAA. However, where the repair action



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specifically requires designing a repair scheme, the repair design must be approved by the BCAA. All changes to limited life components limits must be incorporated in the maintenance programme following the design repair approval.

1.4 Responsibility of Operator/Organisation

The operator, through their Continuing Airworthiness Management system, must manage the process for modifications/repairs and register all modifications/repairs. When managing the process of modifications or repairs the organisation should ensure that Critical Design Configuration Control Limitations (CDCCL) are taken into account.

A person or organisation repairing an aircraft or component should assess the damage against published approved repair data and the action to be taken if the damage is beyond the limits or outside the scope of such data. This could involve repair by replacement of damaged parts, requesting technical support from the type certificate holder or from an organisation approved in accordance with ANTR 21, EASA Part-21 design organisation or in accordance with any other regulation recognised by the BCAA, as appropriate.

The operator is responsible for notifying the BCAA of the particular modification/repair data and ensuring that the modifications are recorded in the Modification Record book kept by the organisation.

1.5 Classification

All modifications and repairs, no matter on what they are based (e.g.: SBs, ADs, etc) are classified into two categories: Major and Minor. The determination of the category may be made on behalf of the operator by a design organisation appropriately approved by FAA and/or EASA.

2. DEFINITION

Modification: A modification to an aeronautical product means a change to the type design which is not a repair.

Note: The term "alteration" is also used instead of modification. These terms wherever used are intended to be synonymous.

Major Modification: A major modification means a type design change not listed in the aircraft, aircraft engine or propeller specifications that might appreciably affect the mass and balance limits, structural strength, performance, power-plant operation, flight characteristics or other qualities affecting airworthiness or environmental characteristics, or that will be embodied in the product according to non-standard practices.

Minor Modification: A modification other than a major modification.

Major repair: Any repair of an aeronautical product that might appreciably affect the structural strength, performance, power-plant, operation flight characteristics or other qualities affecting airworthiness or environmental characteristics, or that will be embodied in the product using non-standard practices.



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Repair: A design change to an aeronautical product intended to restore it to an airworthy condition and to ensure that the aircraft continues to comply with the design aspects of the airworthiness requirements used for the issuance of a Type certificate for that aircraft type after it has been damaged or subjected to wear.

Major repair: Any repair of an aeronautical product that might appreciably affect the structural strength, performance, power-plant, operation flight characteristics or other qualities affecting airworthiness or environmental characteristics, or that will be embodied in the product using non-standard practices.

Minor repair: A repair other than a major repair.

3. MAJOR MODIFICATION CATEGORY

3.1 General

A major modification has an appreciable, or other than negligible, effect on the airworthiness of an aeronautical product. In general, a major modification is an alteration to an aircraft system or structure that affects the aircraft airworthiness/flight characteristics and causes STC generation, and/or requires amendments to the Aircraft Flight manual or Weight & Balance schedule

The applicant should evaluate the technical merit of each modification proposal and establish a clear understanding of the intended and/or consequential effect on the affected product. The intensity of such effect will vary with the complexity and extent of the proposed design change, but is generally recognised as falling under one of the following three levels, presented in order of decreasing effect.

3.2 Substantial Change

A proposed change in design, configuration, power, thrust, speed limitations, or mass is so extensive that a substantially complete investigation of compliance with the applicable airworthiness standards is required. A design change at this level is generally viewed as having a technical scope and nature that the affected product, when modified, can be regarded as essentially a new product, i.e. there are differences in major design and/or production elements. Further, due to the extensiveness of the proposed modification, most of the existing substantiation of the product will no longer be applicable. Therefore, there is a need for a substantially complete, or complete, re-investigation of compliance of the new substantiating data with the applicable airworthiness requirements. For this reason, the level of design change may be enough to warrant an application for a new Type Certificate, rather than as a modification.

Some examples of modifications that are generally regarded as substantial change are:

- (a) in the case of aircraft, the modification involves change in the number or location of engines, change in the number of rotors, increase from subsonic to supersonic flight regime, change from high wing to low wing configuration, or change from an all metal aircraft to an all composite primary structure (fuselage, wing, empennage);
- (b) in the case of an aircraft engine, the modification involves change in the principle of



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operation or use of different principles for propulsion; or

- (c) in the case of propellers, the modification involves change in the number of blades or the principle of pitch change operation.

3.3 Significant Change

A proposed change in the general configuration, principles of construction, assumptions used for the certification, or a combination of these, of a type certificated product but not to the extent to be considered a substantial change. A significant change in the general configuration are design changes that are likely to require a new product model designation to distinguish it from other product models.

A significant change to the principles of construction are changes to the materials and/or construction methods that affect the overall product's operating characteristics or inherent strength.

A significant change to the assumptions used for certification are changes to the product level assumptions associated with the compliance demonstration, performance, or operating envelope so different that they invalidate the original assumptions. The assessment of the effect of a significant change is made on the overall aircraft, engine, or propeller, rather than at the level of a part, component or system.

A significant change usually results in a modified product that is distinct from other models of the same product, while still retaining common major design or production elements. Some examples of modifications that are generally regarded as significant changes are:

- (a) in the case of aircraft, the modification involves increase in the seating capacity, installation of floats or skids, conversion from passenger to freighter version, fuselage stretch, increase in design mass of more than 10 per cent, primary structure change from metallic to composite material, certification for flights into known icing conditions, or comprehensive flight deck upgrades;
- (b) in the case of an aircraft engine, the modification involves use of new design fan blade and fan hub in a turbine engine, change in the containment case material, conversion from mechanical to electrical control systems, addition of a turbocharger, or conversion from spark-ignition to compression-ignition for piston engines; or
- (c) in the case of propellers, the modification involves introduction of a different principle of blade retention.

3.4 Not Significant Change

A design change whose effect on the product does not rise to the level of neither a substantial nor significant change. A Not Significant change remains a major modification, and should not be confused as equivalent to, or treated like, a minor change. The effect of a Not Significant change is usually confined to a single area, system, or component of an aircraft, engine or propeller.

Some examples of modifications that are generally regarded as Not Significant changes are:



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- (a) in the case of aircraft, the modification involves general avionics upgrade, relocation of galley, installation of non-essential auxiliary power unit, substitution of one structural bonding method for another, installation of wheel skis, installation of quieter exhaust system, increase in fuel tank capacity, installation of new type passenger seats, or mass increase of less than 5 per cent;
- (b) in the case of an aircraft engine, the modification involves change in oil tank design, fan blade re-design, software changes, bearing change, change in limits on exhaust gas temperature, change from one hydro-mechanical control to another hydro-mechanical control, change in crankshaft, or redesigned cylinder head, valves or pistons; or
- (c) in the case of propellers, the modification involves change in the material of the bearing or change to a component in the control system.

In summary, a major modification would be any alteration to the original design of the aircraft or its components, including engines and the APU, which does affect the aircraft's airworthiness and flight characteristics and does cause for Supplemental Type Certificate (STC) generation and causes change to all or a combination of the aircraft weight and balance schedule and aircraft flight manual.

3.5 Criteria

The following criteria outline the decisions needed in assessing a modification or repair as major or minor, for each issue, it must be determined whether or not the proposed modification or repair will have other than a negligible effect. The question requires "yes" or "no" responses.

An affirmative answer to any individual question indicates that the modification should be classified as major. The examples and tests listed are for illustration only and not intended to be all encompassing.

- (a) Mass & Balance.
 - (1) Does the change involve a revision in the approved mass limitations or centre of gravity range limits?
 - (2) Does the change require the installation of ballast or other methods to maintain the centre of gravity within the approved limits?
- (b) Flight Characteristics.
 - (1) Does the change involve alterations to the configurations of the aircraft, which may;
 - (i) increase drag;
 - (ii) alter the thrust or power;



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- (iii) affect stability or controllability;
 - (iv) induce flutter or vibration; or
 - (v) alter the stalling characteristics to an extent which necessitates analyses or test?
- (c) Structural Strength.
- (1) Does the change involve a principal component of the aircraft structure such as a frame, stringer, rib, spar or stressed skin?
 - (2) Does the change involve a structural element, which is addressed as part of a damage tolerance or fatigue/failure evaluation?
 - (3) Is a pressure vessel penetration or change involved?
 - (4) Does the change involve the installation of an item of mass necessitating structural re-evaluation?
 - (5) Does the change involve the installation or alteration of a containment or restraint system intended for the stowage of items of significant mass?
 - (6) Does the change involve repairs or modifications to the load-bearing structure of seats, harnesses or their means of attachment or any other occupant restraint equipment?
 - (7) Does the change involve the substitution of materials?
- (d) Powerplant Operation.
- Does the change significantly affect the powerplant or propeller or their accessories?
- (e) Other qualities affecting airworthiness.
- (1) Does the change involve equipment for which there is no performance standard, which has been approved or accepted by the BCAA?
 - (2) Does the change affect the probability of failure conditions, which could impair or preclude continued safe flight or landing?
 - (3) Does the change affect the pilot's visibility or impair the pilot's capability to control the aircraft?
 - (4) Does the change involve alterations to the interior arrangement or cabin materials?
 - (5) Does the change involve systems for cabin pressurisation or the provision of breathing oxygen?
 - (6) Does the change involve flight controls or an autopilot?



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- (7) Does the change involve critical or essential components of the electrical system such as generators, alternators, inverters, batteries, distribution busses, or bus protection and control devices?
 - (8) Does the change affect instruments, indicators or their sub-systems, which provide navigation information?
 - (9) Does the change affect instruments, indicators or their sub-systems, which provide essential or critical information concerning the aircraft status?
 - (10) Does the change affect a regulated placard?
 - (11) Does the change affect any approved information contained in the flight manual or equivalent document?
- (f) Other Qualities affecting environmental characteristics;
- (1) Does the change alter the aircraft noise or emission characteristics?
- (g) Non-standard Practices;
- (1) Does the change involve practices or techniques, which are novel or unproved in the proposed application?

4. MINOR MODIFICATION CATEGORY

A minor modification is a design change that has a negligible, or no appreciable, effect on the mass, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. The accomplishment of minor modifications normally involves use of standard or generally accepted practices.

This modification would be any alteration to the original design of the aircraft or its components including engines and the APU, which does not affect the aircraft's airworthiness status and flight characteristics and does not cause for supplemental type certificate (STC) generation and change to the aircraft flight manual and weight and balance schedule.

5. MAJOR REPAIR CATEGORY

A major repair is usually considered a repair that might appreciably affect mass, balance, structural strength, performance, engine operation, flight characteristics or other qualities affecting airworthiness. A repair in this category normally requires some form of engineering analysis or assessment. The BCAA should evaluate the technical merit of a repair design proposal and establish a clear understanding of the intended or consequential effect on the affected aeronautical product. For example, it may not be appropriate to approve a repair that is purposely designed to be much stronger than the structure being repaired because the effect may be an undesirable change in the original structural load distribution. For the purpose of illustration, the following examples can be used to categorize a major repair:



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- (a) repairs involving a principal component of the aircraft structure, such as a frame, stringer, rib, spar or stressed skin;
- (b) repairs to structural elements that were approved using damage tolerance or fail-safe evaluation;
- (c) repairs to pressurized areas;
- (d) repairs involving the installation of an item of mass necessitating structural re-evaluation;
- (e) repairs to structural attach points intended for the stowage or retention of significant mass;
- (f) repairs to load-bearing structure of aircraft seats, harnesses, or to occupant restraint equipment;
- (g) repairs involving substitution of materials, or use of a different repair process or technique; and
- (h) repairs to components, parts, appliances where form, fit, and function may be affected.

A major repair to an aircraft should be accomplished in accordance with design data approved by the BCAA or an authorized person or organization, such that the repair conforms to applicable standards of airworthiness.

6. MINOR REPAIR CATEGORY

A minor repair involves any repair that does not fall under the major repair category, meaning the repair has a negligible effect on the airworthiness of the affected aeronautical product. The accomplishment of minor repairs normally involves use of standard or generally accepted practices (see 1.2 above).

7. EMISSIONS CHANGE CATEGORY

The BCAA, as the State of Registry, is responsible for the Noise Certificate under ANTR Part V, Chapter 6 and therefore all modifications should be assessed to determine that the ICAO Annex 16 noise requirements are unaffected.

Where a modification is not intended to change the approved emissions limit of an aircraft or engine, an environmental assessment may be required to be conducted to verify the unintended consequential changes to the approved emissions limit of the aircraft or engine. Normally this would be conducted by the State of Design.

However, if the proposed modification is specifically directed at changing or improving the current emissions level of an aircraft or engine (such as retrofit of hush kits or re-engine programme), a re-certification is necessary to establish compliance with the applicable requirements. As part of an assessment of a modification as either major or minor, the proposed modification to emission levels should also be categorised as one or more of the



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following:

(a) Noise Emissions Change.

Any change in the type design of an aircraft which may increase the noise levels of that aircraft;

(b) Engine Emissions Change.

Any change in the type design of the engine which may increase the exhaust smoke and gaseous levels of that engine; and/or

(c) Fuel Venting Change.

Any change in the type design of the aircraft or engine which may affect the certification related to prevention of intentional fuel venting into the atmosphere.

8. COMPATIBILITY OF MODIFICATIONS AND REPAIRS

8.1 Introduction

When any modification or repair is installed on an aircraft, care should be taken to ensure that it is compatible with all other design changes installed on that aircraft. Modifications or repairs designed separately may conflict or interfere with each other, despite having been individually shown to comply with all applicable standards of airworthiness. Interaction between different modifications or repairs may be of a physical, aerodynamic, structural or fatigue strength, electromagnetic or any other nature. Such interaction may jeopardize the airworthiness of the aircraft.

An example of potential incompatibility would be a repair installed in close proximity to an existing repair. While the two repairs individually may be completely satisfactory if separately installed on an aircraft, the combination in close proximity may introduce additional stress concentrations which cause fatigue cracks to occur after a period of time in service. The designer of a repair scheme should survey the aircraft to be repaired to establish whether there are any other design changes in the vicinity which may interfere. In the case of an existing repair in close proximity to the new damage, it may be necessary to remove the old repair and install a new repair encompassing both damaged areas, designed in a manner to reduce any stress concentrations to a level that will not produce fatigue cracking.

In a more general situation, modifications may be separately designed for the same basic aircraft type by different organizations with no knowledge of the other's work. The modifications may be shown separately to comply with all applicable airworthiness standards; however, they may physically interfere with each other. Alternatively, no problems may be encountered with the installations, but it may be found in service that the combination causes aerodynamic buffeting, stability or control problems, fatigue cracking, structural failure, electromagnetic interference, or other problems. If the concurrent installations of different modifications are not rigorously assessed for compatibility, there exists the possibility that in combination they may cause serious airworthiness hazards.



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8.2 Responsibilities of Installers

Because the holder of a design approval for a particular modification or repair cannot be expected to be aware and to have conducted analyses and tests for all the possible design changes installed on all aircraft of a given type, the installer has some responsibility to verify compatibility with other modifications and repairs before installing any design change. As stated in the following paragraph, the ultimate responsibility remains on the operator. The installer should survey the aircraft records and the aircraft itself to determine what other design changes exist on the aircraft. Any questions of incompatibility with other modifications or repairs arising from the survey should be referred for resolution to the operator.

8.3 Responsibilities of operators

Operators have the overall responsibility to ensure the compatibility of all design changes incorporated in their aircraft. The operator contracting with an installer for incorporation of any aircraft modification or repair should provide the installer with information on all existing design changes to the aircraft so that compatibility may be verified. Any questions of design change incompatibility which may arise during installation or in service should be thoroughly investigated by consultation with the approval authority or approval holder, or by an independent engineering organization. In every case of incompatibility between modifications or repairs, the problem must be corrected and it must be established to the satisfaction of the BCAA that the modified aircraft continues to comply with the applicable standards of airworthiness.

In addition to correction of the problem on the aircraft on which it is discovered, it is necessary that any incompatibilities between modifications or repairs be addressed on all other affected aircraft. The operator should promptly report any design change incompatibilities detected during installation or in service to the approval holder, to the installer and to the BCAA.

9. PROCEDURE FOR APPROVAL OF MODIFICATION

Modifications covered in Airworthiness Directives, BCAA Mandatory Modification and Service Bulletins do not require BCAA approval.

Modifications which are not covered in Airworthiness Directives, BCAA Mandatory Modification and Service Bulletins require BCAA approval.

For modifications, the operator shall apply to the BCAA along with evidence and data relating to the intended modification and its effect on the airworthiness of the aircraft, as per details given in paragraph 10, below.

The modification design data and documents prepared by the aircraft, components/equipment manufacturer, which are duly approved by State of Design or the data certified by Authorized Representatives (AR) / Designated Engineering representatives (DER) of the State of Design of the aircraft are acceptable for use in modification of aircraft, components/equipment.

The person responsible for the modification design shall state any particular requirements to



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be observed when the modification is completed and before an aircraft, component or equipment is released for service. The following aspects shall be considered:

- (a) Whether tests or inspections during the progress or after the completion of the modification are necessary to ensure it complies with the specified requirements.
- (b) The qualifications of persons who may be required to assess completed work and certify that it complies with the approved design.
- (c) Whether significant changes in the weight and centre of gravity position of the aircraft will occur and if re-weighing or preparation of a new weight and balance report is necessary.
- (d) Whether the flight or operating characteristics of an aircraft may have been affected by the work and the necessity to have the aircraft inspected and certified as fit for flight and flight tested.
- (e) Whether amendments of particulars in the Certificate of Airworthiness or associated documents are required.
- (f) whether amendments are necessary to the approved maintenance schedule or other data or documents approved for maintenance or other work on the aircraft.
- (g) Whether amendments are necessary to any data specified in the flight crew operating manual.

Where a modification affects the instrument panel, it shall be ensured that instruments which are used by any one pilot are so arranged as to permit the pilot to see their indications clearly from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

Where a modification affects equipment required for communications or navigation purposes, or both, it shall be ensured that the failure of any single unit required for communications or navigation, or both, will not result in the failure of another unit required for communications or navigation.

Modification documents shall bear a modification reference number, title, issue number and date and shall indicate the reason for modification, modification instructions, any limitations and inspection requirements, manuals affected and references to other documents or design data, together with a list of parts and assemblies affected by the modification and, where necessary, drawings or sketches giving particulars of parts before and after modification.

Approval of a modification will only be granted when the BCAA is satisfied that in respect of the design:

- (a) The drawings, documents, reports, calculations, etc., are adequate to establish that the design complies with the appropriate airworthiness requirements.
- (b) Any tests or inspections considered necessary for the approval have been completed satisfactorily,



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- (c) The drawings and other documents required for the work are of a satisfactory standard and in accordance with acceptable aeronautical practices.

The BCAA may require compliance checks after the completion of the modification and before any aircraft component or equipment is released for service.

All changes to an approved drawing or document will require re-approval of the original. The issue or revision number shall be raised following re-approval.

10. PROCEDURE FOR APPROVAL OF REPAIR

Repair covered in the Structural Repair Manual (SRM), do not require BCAA approval. This repair may be carried out by Approved Maintenance Organisation as per data available in SRM.

Repair which is not covered in the SRM requires BCAA approval.

The operator shall apply to the BCAA along with evidence and data relating to the intended repair and its effect on the airworthiness of the aircraft, as per details given in paragraph 10, below.

The operator will classify the damage as minor or major based on manufacturer's relevant documents or seek assistance from the manufacturer.

Once a structural repair has been classified as major or minor, the operator shall submit the repair scheme to the manufacturer for their review or request for a repair scheme by providing the details of damage. Details forwarded to the manufacturer for feedback may include photographs, sketches, relevant pages of maintenance data specifying the area of damage etc.

The repair scheme and approved data received from the manufacturer shall be forwarded to the BCAA for approval. A copy of the Repair and Deviation Record (RDR) and the Repair Design Approval sheet (RDAS), as applicable, shall also be attached along with the repair data and the application for approval.

The repair scheme and approved data prepared by the aircraft, components/equipment manufacturer, which are duly approved by the State of Design or the repair scheme certified by the Authorized Representatives (AR)/ Designated Engineering Representatives (DER) of the State of Design of the aircraft are acceptable for use in the repair of the aircraft, components/equipment.

11. APPLICATION PROCESS

11.1 Minor Modifications/Repairs

The procedure for processing minor modifications/repairs is as follows;

- (a) The operator shall notify the BCAA in writing regarding the nature of the modification/repair;



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- (b) Upon completion of a modification/repair, the operator shall forward to the BCAA a summary of the work accomplished; and
- (c) BCAA may physically inspect the applicable subject aircraft/systems.

11.2 Major Modifications/Repairs

The procedure for processing major modifications/repairs is as follows;

- (a) The operator shall apply to the BCAA in writing, using Form ALD/AIR/F023 (see Appendix 1), giving details regarding the nature of the modification/repair and identifying the available referenced technical documentation;
- (b) BCAA will review the submitted information and notify the operator as to the action required or to proceed with the modification/repair;
- (c) Upon receipt of the reply from the BCAA, the operator shall act accordingly; and
- (d) On completion of the modification/repair the operator shall forward a summary of the work accomplished to the BCAA.

Note: Refer to Sections 2 to 5 respectively for definitions of major and minor modifications/repairs.

11.3 Supporting Documentation

Depending on the nature of the modification/repair the following information should be provided by the operator for major modifications/repairs;

- (a) the name and address of the applicant;
- (b) the make and model of the affected aeronautical product (registration and/or serial number) and its Type Certificate number (or approval reference);
- (c) the title, detailed description, and purpose of the proposed modification/repair, including any changes affecting the noise and emissions level of the aircraft or engine;
- (d) the proposed airworthiness standards, including environmental standards if applicable, to which the proposed modification is designed and with which it is intended to comply;
- (e) documentation and/or substantiating data of the design change; such as
 - (1) STCs, SBs, ADs; and
 - (2) Affected manuals such as;
 - (i) Aircraft Maintenance Schedule;



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- (ii) Weight and Balance Schedule; and
 - (iii) Flight Manual
 - (iv) A master documentation list detailing the individual drawings and specifications, which define the modification/repair;
 - (v) Drawings and instructions necessary for the installation of the modification/repair in the product;
 - (vi) A compliance programme;
 - (vi) Engineering reports which contain the analyses, calculations and test results used to make the determination that the modified product complies with the approval basis;
 - (vii) A record of change in mass and moment arm when the modification is carried out on the aeronautical product;
 - (viii) A record of the change in electrical load when the modification/repair is carried out on an aircraft;
- (g) for a local applicant, an indication on the need for a concurrent or subsequent approval by another State, and;
- (h) for a foreign applicant, evidence of prior approval/acceptance by the State that has jurisdiction over the individual or organisation responsible for the modification/repair.

12. RETENTION OF MODIFICATION AND REPAIR DATA AND RECORDS

12.1 Introduction

The objective of this section is to provide guidance to aircraft operators by setting out acceptable procedures for the retention of modification and repair data and records.

In general case, the holder of the design approval and the aircraft operator may be different. ICAO Annex 6 Part I and III place responsibility for the retention of modification and repair data and records on both the approval holder and the operator. In the case where the aircraft operator is also the design holder, the operator must retain both sets of records.

12.2 Responsibilities of Aircraft Operators

It is required by the BCAA that the aircraft operator retain records identifying any modification or repair incorporated on the aircraft, together with records of design approval and return-to-service approval. Retention of the records is required so that the modification and repair status of the aircraft may be readily established at any time. This may be necessary if an airworthiness deficiency is detected with a modification or repair requiring



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corrective measures or inspections and to ensure compatibility when making additional design changes to the aircraft.

The records required will vary with the complexity of the design change. In addition to the records of design approval and return-to-service approval, the following lists the kind of data that may be included, as applicable:

- (a) a master drawing list and the individual drawings, photographs, specifications and records which identify the design change and locate it on the aeroplane;
- (b) mass and moment change records; and
- (c) a record of any change in electrical load caused by incorporation of the design change.

Part of the records should include a Supplemental Type Certificate (STC) or equivalent document, or service bulletin or structural repair manual reference, if applicable.

It is required that the details of modifications and repairs to an aeroplane and its major components be retained for a minimum period of 180 days after the unit to which they refer has been permanently withdrawn from service. Further, it is also required that in the event of a temporary change of operator, the records shall be made available to the new operator; and, in the event of any permanent change of operator, the records shall be transferred to the new operator.

Supplements to the approved flight manual, maintenance instructions, instructions for continuing airworthiness and repair instructions pertaining to a modification or repair are operating data that the operator should incorporate into the existing operating data for the aeroplane. Since these supplements become a permanent part of the operator's operating instructions or instructions for continuing airworthiness, they need not be retained as part of the records required above. The operator should record the incorporation of the required supplements in the appropriate revision logs.

The record retention requirements for minor modifications and repairs are much simplified. It is nevertheless necessary for the aeroplane operator to retain sufficient records to:

- (a) identify the modification or repair and record that it has been classified as minor;
- (b) record its location (modification/repair) on the aeroplane;
- (c) record mass and moment change, if significant; and
- (d) record the return-to-service approval.



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APPENDIX 1

APPLICATION FOR APPROVAL OF A MODIFICATION/REPAIR

Owner/Operator's Name: _____

Address: _____

Tel. No.: _____ E-mail: _____

Aircraft Type: _____

Aircraft Registration: _____ Constructor's No.: _____

Applicant's Mod./Repair No.: _____

*** Attach all supporting documents with application**

Modification Classification: Major Minor

Brief Description of Modification/Repair:

Original Drawings affected: Yes No

New Drawings introduced: Yes No

List of Affected Manuals and Provide Brief Details:

I hereby declare that the above particulars are true in every respect.

Name

Designation

Signature

Date

Reserved for CAA use only

Modification/Repair Classification: Major Minor

Inspector Name: _____ Date: _____

Inspector Signature: _____



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