



ESWATINI CIVIL AVIATION AUTHORITY

Advisory Circular

CAA-AC-AWS033

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AUTHENTICITY AND SERVICEABILITY OF AIRCRAFT PARTS

1. PURPOSE

The need to ensure that parts installed on an aircraft meet the design specification and are serviceable is self-evident. The installation of any part failing to meet the intended design requirements degrades those requirements, leading to a degradation of airworthiness.

It is essential that for the purposes of continuing airworthiness a system of control exists which ensures that only parts meeting the approved design data applicable to a particular aircraft are installed on that aircraft. This Advisory Circular provides guidance on the establishment of such a system.

2. REFERENCE MATERIAL

Eswatini Civil Aviation Regulations (Approved Maintenance Organization)
Eswatini Civil Aviation Regulations (Airworthiness)

3. GUIDANCE AND PROCEDURES

a. General

Approved parts-An approved part is one whose design has been found to be acceptable to the State of Design, whose proper manufacture has been approved by the State of Registry, and that has been found to be in a condition for safe operation by the State of Registry.

Note. — Parts meeting the above definition above are eligible for installation on a specific aircraft if, and only if, they also meet the approved design data applicable to the particular

aircraft they are to be installed on. For example, a seat designed and approved for 9 g forward loads is not eligible for installation on an aircraft which is required to have a seat that is dynamically tested for 16 g.

Standard parts such as fasteners are considered as approved parts when they are in compliance with a national or industry accepted standard and when referenced in the type design of the particular aircraft.

Unapproved parts -Parts not meeting the criteria described above are considered to be unapproved. Any part not supported by the required documentation would also be considered to be unapproved. Unapproved parts also include those parts improperly returned to service, for example:

- a) Parts supplied directly to the end user by a subcontractor without direct ship authority from the design approval holder and the State of Manufacture to do so;
- b) parts maintained or approved for return to service by a person or organization not approved to do so;
- c) parts not maintained in accordance with the requirements of the applicable approved data; and
- d) parts having reaching their life limit, including, if applicable, any shelf-life limit.

Supporting documentation - A documentation process providing written evidence of the acceptability of a part is an essential element of any system designed to ensure that only approved parts are installed on an aircraft. Such a process is intended to provide all relevant information concerning the part to which it refers sufficient to enable a potential installer to readily ascertain its status. Such documents will contain information relating to:

- a) the authority under which it is issued;
- b) reference identification for the purposes of traceability;
- c) name, address and approval reference of the issuing organization;
- d) work order, contract or invoice number;
- e) quantity, description, part number and, if applicable, serial number of the part;
- f) relevant information concerning any life limitations, including in-service history records;
- g) the signature and approval reference of the person issuing the document; and h) whether the part is new or used.

b. Precautions to prevent the inadvertent acceptance of unapproved parts

Documentary evidence of compliance with an approved process will not in itself provide a guarantee against the installation of unapproved parts if the original supplier of such parts knowingly provides false information or otherwise sets out to deceive.

It is always necessary to have secondary defences in place designed to give early warning of unapproved parts prior to their release for installation.

The primary defence in such cases is a strong, well-informed and alert parts ordering and receiving system which, through auditing and reports, establishes a satisfactory level of confidence in its parts suppliers and which:

- a) ensures a continual correlation between parts ordered and parts received;
- b) is alert to any unauthorized alterations to supporting documentation and to any inability of the supplier to supply the required documentation;
- c) is aware if a quoted price for the part is significantly lower than that quoted by other suppliers;
- d) is aware that delivery times are significantly shorter than those quoted by other suppliers; and
- e) is aware of parts packaging methods used by approved parts manufacturers, maintenance Organizations and distributors, and can detect deviations from these methods.

Organizations, particularly approved maintenance organizations and operators, should ensure that all those staff who have routine contact with parts, including especially buyers, stores staff, mechanics and certifying staff, are fully aware of the dangers posed by unapproved parts and also the likely sources. Ample warnings should be given to such staff about accessing any unapproved parts database. Approved maintenance organizations and operators will also need to ensure that their parts suppliers are fully integrated into the reporting network, and audits will be necessary among staff at intervals to ensure that all remain vigilant to the problem.

c. Unapproved parts reporting

Pursuant to regulation 24 of ESWACARS (Airworthiness), systems used by end users to report to Type Certificate holders and regulatory agencies are intended to provide widespread warning of the detection of unapproved parts so that operators of similar equipment can be made aware as soon as possible. In view of the likely random appearance of unapproved parts, access to a reporting system should be easy and available at all reasonable times. It follows that publicity for the reporting system (and the programmers generally) should be widespread.

In order to obtain as much information as possible from a report of a suspected unapproved part, it is necessary to have a standardized reporting format.

Information required will include part description and from where received; part and (if applicable) serial numbers; particular colours, markings, dimensions and features common to the unapproved part which distinguish it from the genuine item; and the nature of any accompanying documentation.

At any time a part is deemed to be suspect, it and any accompanying documentation should be quarantined immediately and held until the body responsible for processing the reports is satisfied that the evidence is no longer required or until the authenticity of the part has been established.

Some reports of suspected unapproved parts will eventually turn out to be false as further information becomes available in the form of supporting documentation, etc. A successful reporting system should accept such false alarms and the wasted effort they generate in the knowledge that to discourage they might eventually lead to the suppression of a genuine report.

A relatively simple database, preferably computer driven, will be required to maintain a record and allow easy processing of reports of suspected unapproved parts.

The database should be capable of interrogation such that any common thread within the reports received is readily identified by keyword access. The database itself can be a dedicated system or part of a much larger general occurrence reporting system.

In view of the international nature of the aviation industry and in particular the known international nature of the generation and distribution of unapproved parts, reporting of such cases to Eswatini CAA is obviously advantageous being essential in successfully combating the problem.

d. Parts stockiest and distributors

It is recognized that parts stockiest and distributors have a significant influence over preventing the use of unapproved parts. Such organizations have an established commercial role of stocking or obtaining parts, often at short notice. Eswatini does not approve stockiest and distributors.

In airworthiness terms, the parts supplier's role is simply that of a holder of a part and its supporting data for a limited period, the part and data being passed in their entirety to the purchaser. The most effective control is exercised by the purchaser of the parts by ensuring that the part is correct and that the documentation truly reflects the status of the part. Further assurance is provided by the installer purchasing only from those suppliers having a known satisfactory record.

Parts distributors may also break down large orders of identical parts into smaller lots for shipment to end users. In this case they should provide documentation that the parts came from the original large order and either issue a second set of airworthiness documentation, if authorized by their State regulatory authority to do so, or attach a copy of the original airworthiness documentation.

e. Parts removed from an aircraft no longer in service

Aircraft withdrawn from service are often used as a source of spare parts, a process sometimes described as "parting out". These parts, although serviceable at the time the aircraft was placed in storage, may have been affected adversely by storage conditions, including especially environmental factors, or by the length of storage.

The records for the aircraft and its parts prior to the aircraft being placed into storage will need to be researched in order to ascertain the previous maintenance history, and airworthiness directive, modification and repair status of the parts being removed. Any unusual events immediately prior to storage, e.g. heavy landings or lightning strikes, will also have to be considered when deciding on the serviceability of the parts being removed.

It is important that the part removal process be planned and controlled in a manner as close as possible to that adopted for routine maintenance tasks on in-service aircraft. The following points in particular should be considered:

- a) the means by which the part is removed should be in accordance with the normal maintenance data (e.g. maintenance manuals), using the tooling specified;
- b) adequate access equipment should be provided;
- c) if conducted in the open, disassembly should cease during inclement weather;

- d) all work should be carried out by appropriately qualified maintenance personnel;
- e) all open connections should be blanked; and
- f) a protected and enclosed quarantine storage area for the parts being removed should be provided in the immediate vicinity of the work area and
- g) normal maintenance documentary controls should be used, e.g. the use of work sheets or cards to record component removals, and label identification to show serviceability status.

An assessment for condition and eventual return to service of each removed part will need to be conducted by a suitably approved organization. The extent of the work necessary before the part is returned to service may, depending on the factors noted in above, range from a simple external visual inspection to a complete overhaul.

f. Parts recovered from aircraft involved in accidents

When an aircraft has been involved in an accident, the title to the salvage may pass from the insured owner to other persons (e.g. aircraft insurers); this salvage may be offered for sale either complete or as separate aircraft items in an "as is, where is" condition. While some items may be totally unaffected by the accident or incident which caused the aircraft to be declared as salvage, it is essential to obtain clear evidence that this is the case. If such evidence cannot be obtained, the item may not be returned to service.

Before overhaul and reinstallation can be considered, all such items must therefore be subject to airworthiness assessment and inspection in the light of adequate knowledge of the circumstances of the accident, subsequent storage and transport conditions, and with evidence of previous operational history obtained from valid airworthiness records. Confirmation of this assessment in the form of an airworthiness release is essential.

In particular, if a crash load is sufficient to take any part above its proof strength, residual strains may remain which could reduce the effective strength of the item or otherwise impair its functions. Loads higher than this may of course crack the item, with an even more dangerous potential. Further, a reduction in strength may be caused by virtue of the change of a material's characteristics following overheat from a fire. It is therefore of the utmost importance to establish that the item is neither cracked, distorted or overheated. The degree of distortion may be difficult to assess if the precise original dimensions are not known, in which case there is no option but to reject the item. Any suggestion of overheating would be cause for a laboratory investigation into significant change of material properties.

g. Disposal of scrapped parts

Those responsible for the disposal of scrapped aircraft parts and materials should consider the possibility of such parts and materials being misrepresented and sold as serviceable at a later date. Caution should be exercised to ensure that the following types of parts and materials are disposed of in a controlled manner that does not allow them to be returned to service:

- a) parts with non-repairable defects, whether visible or not to the naked eye;

- b) parts that are not within the specifications set forth by the approved design, and cannot be brought into conformity with applicable specifications;
- c) parts and materials for which further processing or rework cannot make them eligible for certification under an approved system;
- d) parts subjected to unacceptable modifications or rework that is irreversible;
- e) life-limited parts that have reached or exceeded their life limits, or have permanently missing or incomplete records;
- f) parts that cannot be returned to an airworthy condition due to exposure to extreme forces or heat and
- g) principal structural elements removed from a high-cycle aircraft for which conformity cannot be accomplished by complying with the mandatory requirements applicable to ageing aircraft.

Scraping of parts and materials may not be appropriate in certain cases when there is an ongoing evaluation process to determine whether a part or material may be restored to an airworthy condition. Examples of these cases include the extension of life limits, the re-establishment of in-service history records, or the approval of new repair methods and technologies. In these cases, such parts should be segregated from serviceable parts until the decision has been made as to whether these parts can be restored to an airworthy condition, or be scrapped.

Scrapped parts should always be segregated from serviceable parts and when eventually disposed of should be mutilated or clearly and permanently marked. This should be accomplished in such a manner that the parts become unusable for their original intended use and unable to be reworked or camouflaged to provide the appearance of being serviceable.

When scrapped parts are disposed of for legitimate non-flight uses, such as training and education aids, research and development, or for non-aviation applications, mutilation is often not appropriate. In such cases the parts should be permanently marked indicating that they are not serviceable; alternatively, the original part number or data plate information can be removed or a record kept of the disposition of the parts.

h. Reporting of Defects, Malfunctions

Pursuant to regulation 24 of ESWACARS (Airworthiness) and regulation 34 of ESWACARS (AMO) all defects shall be reported to the Authority using form CAA-Form-AIW006.

Duly completed form shall be sent to ESWACAA by

Email: airworthiness@eswaca.co.sz

Mail: Box D361, The Gables H126, Kingdom of Eswatini.

**Approved by Director General
Civil Aviation Authority**