

Subject : Grant of approval to Foreign Flight Engineer's Licence

5th June, 1998

1. INTRODUCTION

Flight Engineers are required for a few types of aircraft operating in India. To meet their requirements of flight engineers, some operators employ foreign flight engineers. These flight engineers are required to perform flight duties on the Indian registered aircraft.

Rule 45 of the Aircraft Rules provides that a licence granted by the competent authority of a foreign State may be validated for operating aircraft registered in India subject to the specified conditions. This AAC lays down the procedure for validation of foreign flight engineers' licences.

2. VALIDATION OF FOREIGN FLIGHT ENGINEERS' LICENCES.

Operators seeking approval to utilise the services of foreign flight engineers are required to fulfill the following minimum requirements.

2.1 Foreign flight engineers should be sponsored by the Indian operator for grant of validation.

2.2 The flight engineer should possess a valid F.E. licence conforming to ICAO standards.

2.3 The flight engineer should have atleast 1 00 hours flight experience on the type of aircraft after the endorsement of aircraft type on his FE licence out of which atleast 20 hours should be in the preceding six months.

2.4 The flight engineer should be well conversant with the working procedures of the Indian operator as given in the operator's Operations Manual. In this regard Operations Manager/ Chief Flight Engineer should provide necessary briefing and training to the foreign flight engineer and give a certificate stating that the flight engineer has been trained and is well conversant with the operational procedures. The flight engineer should also be made familiar with the operator's Organisation structure, operations and engineering management and the duties and responsibilities assigned to him.

2.5 The flight engineer should be fully aware of the contents of the Flight Manual with regard to the duties performed by him. The F.E. should have proficient knowledge of English.

2.6 The operators should ensure validity of visa and passport of the foreign flight engineer at all times during the period of approval.

2.7 The operator should ensure that the medical examination of the flight engineer has been carried out and is valid during the period of working in India.

2.8 The operator should ensure that the necessary security clearance for the foreign flight engineer has been duly obtained before seeking approval.

2.9 The flight engineer should be examined by a Board under AIC 17/94.

3. Procedure for Security Clearance of Foreign Flight Engineers

The operators seeking approval of foreign flight engineers should apply to DGCA Hqrs for security clearance in the proforma given in Appendix 1.

In accordance with instructions of the Ministry of Home Affairs issued vide OM No. 25022/61/86-F.1 dated 26th May, 1986, security clearance is not required in the following cases:

(a) Foreign technicians and experts coming to India for a period less than three months, in pursuance of a collaboration agreement between foreign and Indian firms, provided the agreement has been approved by Government of India.

(b) Nationals of Nepal and Bhutan.

(c) Officials and employees of U.N. and its specialised agencies.

4. Procedure of Examination under AIC 17 of 1994.

4.1 After receipt of security clearance of the foreign flight engineer, the DGCA Hqrs intimates the operator to approach regional/sub-regional airworthiness office for examination of their foreign flight engineer under AIC 17/94 for validation of his foreign licence. The examination will be conducted at Regional office by a board constituted by DAW/CAW of the regional/ sub-regional airworthiness office with the association of representative of DGCA Hqrs.

The board should ensure the following:

a. All relevant documents including qualifications, recency of experience, licence endorsements/ approvals held and medical and their validity are available.

b. The flight engineer has good knowledge of the operator's Operations Manual, company policies and procedures and his knowledge of the aircraft/engine/systems in general as relevant to his duties.

c. The flight engineer should be specifically examined on the special features unique to the aircraft operated by the firm.

d. If required, the flight engineer may be subjected to practical test on the type of aircraft to assess his knowledge and skill.

e. The familiarity of the flight engineer with the operations and engineering management structure, transit inspection and necessary certification in case of diversion, MEL, snag reporting etc. may be assessed.

f. The capability of the flight engineer to understand and communicate in the English language may also be examined.

9. The flight engineer may also be examined with regard to transit and preflight schedules and any additional items related to the job.

4.2 On successful completion of examination, Regional/Sub-regional Airworthiness office shall forward his recommendation to the Hqrs. regarding validation to the foreign flight engineer's licence. The flight engineer's licence will be validated under Rule 45 of the Aircraft Rules, 1937, for a limited initial period of six months by DGCA Hqrs,

4.3 The validation will be subject to the following conditions:

i. The flight engineer continues to be in the employment of the sponsoring Organisation.

ii. The flight engineer licence remains current

iii. He is medically fit to exercise the privileges of his flight engineer's licence.

iv. Any other conditions specified by DGCA.

4.4 During the period of validity of flight engineer's licence the Operations Manager shall monitor the work performed by the foreign flight engineer and ensure that proper inspection and operation is carried out by the flight engineer.

5. Renewal of Validation.

The flight engineer licence of the foreign flight engineer shall be renewed on fulfilling the following conditions:

5.1 Passing the Air Regulations examination conducted by the Central Examination Organisation of DGCA. The Operations Manager/Chief Flight Engineer should forward the application for examination to C.E.O. along with a certificate of experience.

5.2 A recency of experience of not less than 20 hours of flight time as a flight engineer within a period of six months immediately preceding the date of application for renewal shall be required.

5.3 The flight engineer should have valid medical examination.

5.4 The flight engineer should continue to hold valid visa and passport.

(R. P. Sahi)

Director of Airworthiness

ANNEXURE I

INFORMATION REQUIRED FOR SECURITY CLEARANCE OF FOREIGN ENGINEERS/FLIGHT ENGINEERS

1. Name of the Engineer/Flight Engineer
2. Nationality
- 3 Permanent Address
4. Date of Birth
5. a) Passport No.
b) Validity
6. Visa details
7. Details of the licence held
 - a) Country of issue
 - b) Validity
 - c) Medical
 - d) Rating/endorsement
8. Flying/Maintenance Experience:
 - a) Total experience
 - b) Type of aircraft for which authorisation has been sought
 - c) Experience during the Previous one year
 - d) Date when last flown
9. Past history details (Any accidents, incidents, suspension of the licence)
10. Level of knowledge of English language

II. Whether previously operated Indian registered aircraft.

12. Any other information

SIGNATURE OF THE AUTHORISED PERSON

ANNEXURE II

Name of the Issuing Office)

APPROVAL NO.

Name:

Holder's Licence No.:

(If applicable)

Sponsoring Organisation:

Scope of Approval:

Restriction:

This approval is issued under the authority of sub-rule (7) of Rule 61 of the Aircraft Rules, 1937, and is subjected to the following conditions:

- (i) The holder continues to be in employment of sponsoring Organisation.
- (ii) The holder's licence remains current (if applicable) and he is medically fit to exercise the privileges of the approval.
- (iii) The work certified by the holder under this approval shall be qualified with the statement 'Under Approval from DGCA' quoting the approval number and date.
- (iv) The approval is valid for a period as specified below and can be withdrawn at any time if deemed necessary by DGCA-

Authorised Signatory

Seal of Office

Valid from To Authorised Signatory

Seal of Office

Subject : Guidelines for procuring parts manufactured by parts manufacturing approval holders (PMA).

1st July, 1998

1. INTRODUCTION

Manufacture and supply of spares for any rotatable is usually the responsibility of the original manufacturer (OEM) of the equipment. The OEM, therefore, gives the part numbers to each individual part. As the new models are evolved the OEMs sometimes lose interest in support old items, making their availability scarce.

For economic operation many operators desire to procure parts from approved sources other than the original equipment manufacturer without compromising safety of operation. FAA has a system of granting approval called as Parts Manufacturer Approval (PMA) which permits the holder to manufacture and supply aircraft parts to OEMs, repair agencies and operators in lieu of parts manufactured by OEM provided such parts manufacture has the approval of FAA. Use of such parts does not in any way affect the airworthiness of the aircraft. Such parts are identical in design specifications and part number to that of original manufacturer. Such parts are not bogus parts. They meet the drawing and material specifications and are manufactured under approval. Often, PMA parts are cheaper than the OEM parts as PMA does not have to spend on R&D. These components may include feather seals, shims, actuating arms, engine parts and standard hardware including nuts, bolts, rivets etc. The PMA parts are identified by OEM's part number with either a prefix or suffix to differentiate it from OEM part number and to have a traceability.

This advisory circular lays down the guidelines for procuring parts for installation on Indian registered aircraft from firms holding PMA issued by regulatory authorities acceptable to DGCA, and provides guidance on important features before accepting such parts.

2. GENERAL REQUIREMENTS

Operators may procure parts manufactured by holders of PMA issued by FAA or JAA subject to the following conditions:

1. The operator will ensure that the holder's approval is current and it covers the specific parts which are to be procured. Copies of approvals with limitations and restrictions if any, must be procured.
2. The operator will satisfy himself that the PMA holder has established credibility and good reputation as a manufacturer and has been supplying such parts to various airlines/operators of repute.

3. The operator should ensure that FAA/JAA/CAA is subjecting the PMA holder's organisation to regular surveillance with satisfactory results.
4. The operator should satisfy himself that the parts manufactured by the PMA holder do not have a history of repeated failures and have achieved a satisfactory service life.
5. New PMA components should be traceable to the PMA holder's Parts Catalogue and be in a satisfactory condition for fitment.
6. The new component should be accompanied by a release document issued by the manufacturer or Production Certificate holder. The release document should clearly state that it is issued under the approval of the relevant national airworthiness authority under whose regulatory control the manufacturer or Production Certificate holder works.
7. For information, release documents are as follows for PMA components originating from:
 - (a) a JAA full member State - JAA Form One.
 - (b) Canada - TCCA Form 24-0078
 - (c) the USA- FAA Form 8130-3.
8. Customer supplied new components may be fitted subject to such components being accompanied by any of the above documents specifying origin or the relevant release document from the State of origin.
9. FAA PMA parts may only be fitted to products of USA origin and only when accompanied by a FAA Form 8130-3.
10. JAA JPA parts may only be fitted to products of JAA member states' origin and only when accompanied by the relevant document.
11. Standard parts are exempt from the foregoing provisions, except that such parts should be accompanied by a conformity statement. A standard part is a part specified in a Type Certificate holders Standard Parts Manual or a part specified in the Type Certificate holders Parts Catalogue by its national or international specification. For example, a standard fastener, diode, capacitor etc.,.
12. The operator should ensure that PMA parts used in respect of parts which have been identified as a critical part by the manufacturer.
13. While placing order for the parts, the operator should intimate the PMA holder the aircraft / engine on which the part is intended to be installed.
14. The operator should monitor the performance of parts obtained from PMA holders and should discontinue such procurement if high failure rates for such parts are observed.
15. Details of parts obtained from PMA holders should be available for scrutiny by DGCA office.

(R. P. Sahi)

DIRECTOR OF AIRWORTHINESS



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO. 3 of 2000
Date: 3rd February 2000

AIRWORTHINESS ADVISORY CIRCULAR

Subject: GOOD MAINTENANCE PRACTICE

International Civil Aviation Organisation has suggested through various ICAO Documents that the maintenance organisations may evolve a system called good maintenance practice while carrying out various maintenance activities by their maintenance personnel. If followed, this practice will improve the standard of maintenance, airworthiness/ safety and also result in reduced incidents/ loss of revenue.

Further, with the advancement in aviation industry, the maintenance tasks have become more and more explicit. The manufacturers of aircraft and its equipment give detailed instructions for maintenance of their products. The regulatory authorities too lay down various regulations which are generally related to safety of travelling passengers. However, there are healthy working norms which may not be classified under 'rules and regulations'. These norms are good maintenance practices which need to be inculcated into every maintenance organisation and will help maintenance personnel to carry out their jobs meticulously and in a more professional manner.

Good maintenance practices are given here in the form of checklists. These checklists comprise of questions of introspection which various technical persons must ask themselves. Scrupulous adherence to these practices will eventually be conducive to safety and help in achieving the goal of enhanced airworthiness/ safety standards.

This Airworthiness Advisory Circular has been issued in the interest of improving the maintenance standards of the personnel as well as the organisation engaged in maintenance activities.

Keeping in mind the above, the Airworthiness Directorate has prepared the following checklists covering various aspects of good maintenance practices which are annexed to this advisory circular.

- Personal Minimums;
- Manager;

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

- Major Maintenance Hangar;
- Line maintenance;
- Workshops.

It is needless to say that every individual while undertaking any maintenance work may carry the checklist on "Personal Minimum" and may complete the said checklist before commencement of work and after completion of the work. This will also help in enhancing the individual confidence regarding the work undertaken. Further, the checklist on specific area i.e. major maintenance, line maintenance, workshops etc. may also be taken care of while engaged in such area of maintenance.

DGCA representatives while carrying out spot check/ surveillance may ensure on the above aspects.

Sd/-
(L.A.MAHALINGAM)
Director of Airworthiness
for Director General of Civil Aviation

GOOD MAINTENANCE PRACTICES

CHECKLIST ON PERSONAL MINIMUMS

This checklist may be carried and followed by the personnel while engaged in maintenance of aircraft/ aircraft component/ items of equipments. This checklist will definitely help the person in carrying out the maintenance task in proper manner. The checklist may be divided into two parts and may contain at least the followings questions:

PART I (BEFORE THE TASK)

1. Am I mentally prepared to perform the job task?
2. Am I physically prepared to perform the job task?
3. Do I have the knowledge to perform the task?
4. Do I have the technical data to perform the task?
5. Have I performed the task previously?
6. Do I have the proper tools and equipments to perform the task?
7. Have I had the proper training to support the job task?
8. Have I taken the proper safety precautions to perform the task?
9. Do I have the resources available to perform the task?
10. Have I gone through the regulatory requirements to ensure compliance?
11. Do not memorise. Always refer to the procedure sheet/ manual for correct procedure/ values. Ensure that the procedure sheet/ relevant page of manual is available which carry out the job.

PART II (AFTER THE TASK)

1. Did I performed the task to the best of my abilities?
2. Was the job task performed to be equal to the original?
3. Was the job task performed in accordance with appropriate data?
4. Did I use all the methods, techniques and practices acceptable to the industry?
5. Did I perform the job task without pressures, stress and distractions?
6. Did I re-inspect my work or have someone inspect my work before return to service?
7. Did I make the proper entries for the work performed?
8. Did I perform the operational checks after the work was completed?
9. Did I clean up the area after completion of the work?
10. Am I willing to sign on the bottom line for the work performed?

GOOD MAINTENANCE PRACTICES

MANAGERS

1. Are my technical persons mentally and physically prepared and technically competent to undertake the task?
2. Is any of my technical person addicted to the use of substances which could impair his ability to properly do the job assigned to him?
3. Are my technical persons holding valid authority to do the job?
4. Have I provided necessary tools, equipment, literature and protective equipment to the technical persons?
5. Do I have adequate number of persons and are they requisitely qualified?
6. Is ground support equipment satisfactory? Are docks, trestles, stands, ladders etc. adequate? Are these equipments unstable and likely to cause damage to the aircraft or injury to persons? Do these equipments have proper safety aspects such as protective railing, rough floor, brakes etc.
7. Is the work place well lighted? Are spotlights in sufficient number provided?
8. Is adequate ventilation provided? Is number of fans provided satisfactory?
9. Does the hangar have adequate fire fighting equipment of the correct type? Are my workers trained to use the equipment? The managers must ensure that all persons are trained by equipment manufacturer and a document showing their training should be available.
10. Are sand and water buckets available? These should be available in addition to the normal fire extinguisher.
11. Is first aid box available in the maintenance area? Are its contents satisfactory? The facility for attending to electrical shock (electrocution), burns, bleeding and eye wash etc. must exist.
12. Where necessary, have protective clothing been given - such as helmet, gloves, masks, welding glasses, overalls, rubber soled shoes etc. been provided?
13. Have adequate benches been provided for keeping components removed from the aircraft?
14. Is a quarantine area available?

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

15. Are relevant inspection schedules, task cards and extracts from AMM available? In some cases, a microfilm reader or printer may be necessary. Has the literature been updated lately?
16. Is there access to photocopies and computer (incase of manuals being available on CD-ROM).
17. Are adequate number of spare off-job sheets, U/S tags available?
18. Are consumables and spares available? These may include general items such as cleaning agents, rags etc.
19. Are the portable lights/ electrical lamps provided with protective covering/ wire guards? Are plugs provided for all electrical leads where extension boards are used?
20. Are pressurized gas cylinder properly kept on trolleys?
21. Are inflammable materials segregated? Is the area of keeping such materials suitably placarded and protected?
22. Are life expired consumables being used? Are these marked with "DO NOT USE" labels and segregated?

GOOD MAINTENANCE PRACTICES

MAJOR MAINTENANCE HANGAR

1. **Before start of work ensure that you carry checklist on " Personnel Minimums" and refer it.**
2. Ensure that you are physically as well as mentally prepared to undertake the work assigned to you.
3. Be disciplined at your work place.
4. Be dressed properly at work place (e.g. wearing overall, shoes with rubber sole). Loose clothings should not be worn.
5. Reading of messages (if any) displayed on the "Notice Board" related to the work assigned.
6. Planning of work sequence when more than one trade is involved.
7. Obtain proper briefing of work call-outs before start the work.
8. Listing of tools drawn from the Tool-Crib and keeping them in a proper tool box/ bag. Check the details fore proper calibration.
9. Physical verification of tools with the list upon completion of the assigned work and before returning them to Tool-Crib.
10. Check the hangar floor prior to docking of aircraft which could cause damage to aircraft tyres.
11. Remove watches, pens, sunglass, any loose item etc. before starting the maintenance work.
12. Maintain cleanliness around the work place.
13. Observe proper safety precautions/ instructions while working over wing, vertical/ horizontal stabilizer, cockpit windows, cockpit etc.
14. Blank all probes, ports, connector, all open pipes, tubes, quill ports, cavities etc. from which components are removed, immediately with proper blankings (Masking/ adhesive tape shall not be used).

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

15. All removed parts be kept on proper stand meant for the purpose and in a arranged manner. No component should be kept on the ground. Components should not be kept one above the other.
16. Avoid spilling of oil, hydraulic fluid, lubricants etc. on the aircraft/ hangar floor.
17. Put saw dust etc. on spilled oil, hydraulic fluid etc and get it cleaned immediately.
18. Use proper tray while replenishing/ draining engine oil, hydraulic fluid, lavatory fluid etc.
19. Remove excess grease upon completion of greasing operation.
20. Do proper labeling of component just after it is removed from the aircraft.
21. Read the tag/ release note attached to the component/ equipment before it is fitted on the aircraft.
22. Do not install any component / equipment that is without tag/ release note.
23. Ensure the calibration status of items such as pressure gauges of nitrogen trolley, tyre pressure gauge, torque wrench, volt meter, multimeter, proof-loading of jacks, engine slings etc. which requires periodic calibration, before use.
24. Use protective clothes/ goggles/equipments while working on grinding wheel, painting etc.
25. Remove all tools, equipments, rags, debris etc. following aircraft maintenance for the shift/ day.
26. Pick up any rubbish in the hangar and place in waste bins.
27. Clean the mud etc. from footwear prior to aircraft maintenance.
28. All safety wires and split pins etc. removed during maintenance shall be placed in waste bin. Do not reuse them.
29. Keep aircraft hardware such as rivets, nuts, bolts, screws etc. in a container during assembly/ disassembly.
30. Unpack parts and equipment away from the work area.
31. Observe proper safety precautions/ instructions while installing/ removing the Electrostatic Sensitive Devices.
32. Avoid touching exposed electrical terminals.

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

33. Always carry and refer appropriate maintenance manual, inspection schedule etc. while carrying out maintenance. Never believe on your memory. Manuals should be kept as near to the workstation as possible.
34. Inform any service difficulty faced during maintenance to competent authority before proceeding further.
35. Before start of maintenance, it is always good to refer relevant chapter of maintenance manual dealing with Standard maintenance Procedures in respect of particular type of aircraft, engine, propeller etc.
36. Always use proper tools. Do not use worn out tools.
37. Know the location and how to operate fire fighting equipments and their specific usage in respect of particular fire.
38. Use appropriate and approved consumable items such as rivets, locking devices, sealant, "O" rings, gaskets etc. during the maintenance. Check the validity of cure date before use.
39. Keep the ladder, step ladder, working stand etc. free of oil, hydraulic fluid, grease etc.
40. Ensure proper earthing of aircraft prior to start of maintenance.
41. Place chocks after the docking of aircraft. There should be sufficient gap between the tire and the chock.
42. Ensure that the ladder, stepladder, working stand etc. have rubber boots/ pads in the edges and are locked properly before doing any maintenance using them.
43. Upon completion of the maintenance work, complete the documentation procedure on priority.

Ensure that the checklist on "Personal Minimums" has been completed.

GOOD MAINTENANCE PRACTICES

LINE MAINTENANCE

1. **Before start of work ensure that you carry checklist on " Personnel Minimums" and refer it.**
2. Ensure that you are physically as well as mentally prepared to undertake the work assigned to you.
3. Be disciplined at your work place.
4. Planning of work sequence when more than one trade is involved.
5. Obtain proper briefing before start the work.
6. Listing of tools drawn from the Tool-Crib and keeping them in a proper tool box/ bag.
7. Physical verification of tools with the list upon completion of the assigned work and before returning them to Tool-Crib.
8. Check the tarmac surface for FOD.
9. Remove watches, pens, sunglasses, any loose item etc. before starting the maintenance work.
10. Maintain cleanliness around the work place.
11. Blank all probes, ports etc. if the aircraft is to be parked for a prolonged period. Use of masking tapes for blanking purposes is prohibited.
12. Avoid spilling of oil, hydraulic fluid ,lubricants etc. on the aircraft/ tarmac floor.
13. Use proper tray while replenishing/ draining engine oil, hydraulic fluid, lavatory fluid etc.
14. Remove excess grease upon completion of greasing operation.
15. Do proper labeling of component just after it is removed from the aircraft.
16. Read the tag/ release note attached to the component/ equipment before it is fitted on the aircraft.
17. Do not install any component / equipment that is without tag/ release note.

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

18. Ensure the calibration status of items such as pressure gauges of nitrogen trolley, tyre pressure gauge, torque wrench, volt meter, multimeter ,proof-loading of jacks, engine slings etc. which requires periodic calibration, before use.
19. Remove all tools, equipments, rags, debris etc. following aircraft maintenance for the shift/ day.
20. Clean the mud etc. from foot-wear prior to entering into the aircraft.
21. All safety wires and split pins etc. removed during maintenance shall be placed in waste bin. Do not reuse them.
22. Keep aircraft hardware such as rivets, nuts, bolts, screws etc. in a container during maintenance.
23. Observe proper safety precautions/ instructions while installing/ removing the Electrostatic Sensitive Devices.
24. Avoid touching exposed electrical terminals.
25. Packages labeled as ESD should not be opened by any person than those trained.
26. Ensure that exposed electrical terminals of normal ESD, LRUs that are housed in a metal case are fitted with conductive caps.
27. Ensure that ESD decals are attached to the appropriate transit container.
28. Do not install any incorrectly packaged ESD items on the aircraft.
29. Remove the conductive cap from the serviceable LRU and fit the cap to the removed LRU prior to returning to stores. Attach a caution decal if one is not already attached. This will identify the unit as an ESD.
30. Always carry and refer appropriate maintenance manual, inspection schedule etc. while carrying out maintenance. Never believe on your memory.
31. Inform any service difficulty faced during maintenance to competent authority before proceeding further.
32. Before start of maintenance, it is always good to refer relevant chapter of maintenance manual dealing with Standard Maintenance Procedures in respect of particular type of aircraft, engine, propeller etc.
33. Always use proper tools. Do not use worn out tools.

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

34. Use appropriate and approved consumable items such as rivets, locking devices, sealant, "O" rings, gaskets etc. during the maintenance. Removed 'O' seals should be destroyed to avoid inadvertent reuse.
35. Keep the ladder, step ladder, working stand etc. free of oil, hydraulic fluid, grease etc.
36. Ensure proper chocking of aircraft . There should be some gap between the chock and the tyre(s).
37. Ensure that the ladder, step ladder, working stand etc are locked properly before doing any maintenance using them.
38. Upon completion of the maintenance work, complete the documentation procedure on priority.
39. Extreme care must be taken while wearing any loose items such as cap/ hat , shirts with loose buttons, torn pockets etc. in the vicinity of aircraft with engines running to ensure they cannot be ingested into an engine or into the rotor disc.
40. Ensure that the landing gear locking devices, pitot probe covers etc are fitted with red streamers.
41. Ensure that the person carrying out marshalling is properly trained and wears yellow marshalling jacket and uses proper signaling devices during such operation.
42. Take proper precautions and follow manufacturer's instructions while removing gyros, whether remote or self contained with an indicator. In practice, gyros should not be removed from their installation mountings within atleast 20 minutes after power has been removed from this unit.
- 43. Ensure that the checklist on "Personal Minimums" has been completed.**

GOOD MAINTENANCE PRACTICES

WORK SHOPS

1. **Before start of work ensure that you carry checklist on " Personnel Minimums" and refer it.**
2. Do not enter any shop with dirty clothes, shoes etc.
3. Keep work benches clean.
4. Keep necessary tools & test equipments in arranged manner.
5. Before testing any component/ equipment, ensure that the meters, guages etc. are calibrated (as applicable).
6. Use proper and approved method of cleaning the component/ equipment.
7. Use proper trays for cleaning the components/ equipments (as applicable).
8. Adhere to organisation/ manufacturer's procedures and safety precautions.
9. Be disciplined at your work place.
10. Obtain proper briefing before start of work.
11. Do not undertake any work if the component / equipment is without proper tag.
12. Pickup any rubbish in the shop and place in covered waste bins kept for the purpose.
13. Keep rivets, nuts, bolts, screws etc. in a container during assembly/ disassembly of component/ equipment.
14. Before start of work, ensure that the reference documents such as procedure sheet/ manufacturer's manuals etc are current and kept at work place.
15. Before testing of any component/ equipment, ensure that test equipments / rigs are cleaned, operational and calibrated.
16. Ensure that Test stand/ rigs/ ATEC stations are fitted with proper hoses/ harness and they are cleaned and properly blanked.
17. Ensure that spares/ consumables used during maintenance are appropriate and of approved type, batch number/ cure date traceable and from approved sources.

AIRWORTHINESS ADVISORY CIRCULAR No. 3 OF 2000

18. Do not keep any consumable materials such as 'O' rings, seals, gaskets under personal custody.
19. Dispose waste oil, fuel, hydraulic fluid, soiled rags etc into waste containers provided at work place.
20. Be aware of the potential for damaging internal components through mishandling of Electronic equipments that are electrostatically sensitive.
21. Packages labeled as ESD should not be opened by any person than those trained personnel at specifically provided ESD grounded work stations.
22. Always refer and adhere to the practices and procedures for handling ESD in the relevant AMM/ overhaul Manual/ CMM.
23. Know how the ESDs are identified.

Ensure that the checklist on "Personal Minimums" has been completed.



AAC NO. 6 of 2000
Date: 20th December 2000

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: HANDLING OF ELECTROSTATIC DEVICES

1. Introduction:

Some of the electronic components/semiconductor devices installed on modern aircraft are highly sensitive and prone to damages due to discharge of static electricity. These extremely sensitive components/devices are called as ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. Affixing special label on them identifies such devices. Different types of labels used for this purpose are shown below:

PACKAGE LABELS:



LRU/ASSEMBLY LABELS:



ESDS SYMBOLS



The human body, all work surfaces, floors, personnel clothing, packaging materials are prime generators of electrostatic voltages.

A person walking on aircraft carpet, removing his shirt, rubbing his hair accumulates electrostatic charge of over 1000 volts. If such a person touches an ESDS, the device gets damaged due to static discharge. Most people cannot feel an electrostatic discharge below 3000 volts. A visible spark occurs normally above 12000 volts. Therefore, the person may become charged during normal work and damage an ESDS even without realizing it

A list of sources of electrostatic charge and the charge developed thereof is tabulated below.

TYPICAL ELECTROSTATIC VOLTAGES

<u>MEANS OF STATIC GENERATION</u>	<u>RELATIVE HUMIDITY LOW 10-20%</u>	<u>RELATIVE HUMIDITY HIGH -65-90%</u>
Walking across carpet	35,000V	1,500V
Walking over vinyl floor	12,000V	2,500V
Worker at bench	6,000v	100V
Vinyl envelopes for work instructions	7,000v	600V
Poly bag picked up from bench	20,000V	1,200V
Work chair padded with urethane foam	18,000V	1,500V
16-lead"Dips'in plastic box	12,000V	3,500V

The primary objective of all electrostatic prevention method is to prevent static charge accumulation.

This Advisory Circular aims in dealing with the general precautions to be taken by personnel while handling ESDS equipment and procedure to be adopted for repair, storage of such devices. In addition, it is essential that precautions issued by the individual vendors for each component should be meticulously followed.

2. Precautions to be taken while installing/removing ESDS devices:

- (i) Electrical power sources must be removed.
- (ii) Wear a wrist strap around the bare wrist that in turn is connected to ground by means of a wire and plug.
- (iii) If an ESDS sub-assembly is removed from the aircraft, its connecting pins/leads must be shorted together by means of wires, shorting clips, metal foil or a

conductive foam. Printed circuit board connections must also be shorted as above to keep all components at the same voltage potential.

- (iv) Top level assemblies or equipment that are fully assembled with all covers are not normally considered electrostatic sensitive. However, connectors of such ESDS units should be properly blanked with antistatic blanks, packed in protective antistatic packing material (pink poly) and transported as per para 3. The blanking, packing and containers of serviceable ESDS equipment/Line replaceable units (LRUs) should be used for unserviceable components removed from aircraft.

3. Precautions to be taken while transporting ESDS:

The unit should be placed in a special container to protect from static electricity, after taking precautions as given in para 2(iii) and (iv). A semi-conductive bag is often used for this purpose.

4. Precautions to be taken in the shop:

- (i) The working environment in the shop should be conducive to prevent discharge of static electricity. The air in the shop should be dry and have a relative humidity of 40% to 60%. (Dry air will not discharge the static electricity as quickly as moist air). In special circumstances an air-ioniser blower which continuously blows air containing positive and negative ions onto the work surface and onto the hands of the person working may be used.
- (ii) The work surface of the bench should be covered with a conductive mats/dissipative surface, which should be secured to the bench so as to prevent it from moving.
- (iii) The floor area in front of the working bench should also have conductive mat similar to the working bench. This mat should be electrically bonded to the work surface by means of a bonding strap. The bonding strap should have a resistance of 2000-4000 ohms per linear foot and should be as short as possible.
- (iv) The working personnel must wear bonding strap on the wrist as given in para 2(ii). The strap should be connected to the workbench. The strap should have a resistance of 200k ohms to 1 M ohms.
- (v) The work surface should be connected to a suitable ground
Note: Under no circumstances the work surface of a static free workstation be connected to the electrical power supply ground circuit of the building.
- (vi) When air ioniser blower is used, allow the blower to blow air for about 2-3 minutes before starting the work. The person should also move his hand into the ionised air stream for a few seconds, to allow for charge dissipation, before handling ESDS devices.
- (vii) Electric soldering iron in use should be grounded at the tip.
- (viii) The connector leads or edge of PCB's containing ESDS devices should not be touched.
- (ix) Ensure that the body is grounded.
- (x) All testing of equipment with ESDS devices should strictly be in accordance with manufacturer's instructions.
- (xi) Hand tools with painted wooden or plastic handles should not be used in a static-controlled work area in case the operator does not use ground wrist strap.
- (xii) Tools with highly static generative handle should be avoided and should be checked for static generation with an Electro-static detecting meter before use.
- (xiii) Manuals and Technical documents should not be carried into a static control workstation in plain plastic envelope. This can be carried in cardboard binder or stiff paper.

5. Precautions to be taken during storage:

- (i) Electro static devices must never be stored alongside non-electrostatic devices.
- (ii) ESDS components must be packed in conductive material, which will ensure that the entire package is maintained at the same potential.
- (iii) A conductive mat should be provided on the metal racks for storing ESDS devices.
- (iv) The metal racks/cupboards should be grounded.
- (v) All packages containing components coming into the bonded stores should be checked for the presence of ESDS by reference to external markings and reference numbers. Any package containing ESDS but not properly marked should be labeled accordingly and should be handled and stored as mentioned above.

6. General:

- (i) Personnel working on ESDS should avoid wearing dress made of nylon or synthetic fabric.
- (ii) Ensure that the body is grounded before commencing any work on the ESDS.
- (iii) Proper safety techniques as recommended by the vendors should be strictly followed while testing the units with ESDS devices under power.
- (iv) The effectiveness of an electrostatic free workstation should be periodically checked using electrostatic detecting meter. This meter can detect the polarity and level of static electricity ranging from 30 to 50,000 volts at distances of 6.5 to 30 cm.
- (v) Periodic checking of work bench the ground connection, cords, limiting resistors, work mats to be carried out preferably once in six months.
- (vi) Wrist strap integrity may be measured with wrist strap tester or standard ohmmeter, which should be between 2,50,000 ohms to 1.5 meg. Ohms.
- (vii) For conductive work surface the measured value should be less than 1000 meg. Ohms.
- (viii) For conductive floor and anti static work surface, the measured value should be less than one teraohms.
- (ix) Operator using ESDS equipment should intimate officials of customs department for proper handling.
- (x) Following word should be displayed in the workstation in capital letters:

'CAUTION: REMOVE ESDS DEVICES FROM AREA BEFORE USING THE MEGOMMETER.

Sd/-
(N.Ramesh)
Deputy Director General of Civil Aviation
for Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO. 8 of 2000
Date: 4th April, 2001

AIRWORTHINESS ADVISORY CIRCULAR

**SUBJECT: REFRESHER TRAINING FOR AME LICENCE/
APPROVAL & CERTIFICATE OF COMPETENCY
HOLDERS.**

1 INTRODUCTION

Civil Aviation Requirements Section 2, Series 'L' Part VII, Series 'L' Part X and Series 'L' Part XIV requires periodic refresher course for holders of AME licences, Approvals and Certificate of Competency (excluding welders).

Personnel mentioned above (excluding welders) are required to undergo refresher course at least once in twenty-four months.

This advisory circular aims to ensure that the personnel certifying the airworthiness of aircraft, engines and its components have current and updated knowledge on the following:

- i) DGCA regulations
- ii) Organisation structure.
- iii) Current technology
- iv) Aircraft Maintenance Manual, Component Maintenance Manual, Service Bulletins, Airworthiness Directives, etc.,
- v) Human Factors
- vi) Quality Control manual
- vii) Case studies of repetitive snags, incidents, accidents due to maintenance lapse
- viii) Good maintenance practices
- ix) Staff notices/ technical circulars issued since last two years
- x) MMEL/MEL
- xi) Any other relevant topics.

2 APPLICABILITY

The contents of this AAC is applicable to following personnel

2.1 holding AME licence covering the fleet of the organisation where they are employed.

Note 1: Personnel holding licence not covering the fleet maintained by the organisation and thereby not exercising the privileges of the licence held by them may not undergo refresher course for the purpose of renewal of licence

Note 2: Retired / unemployed personnel who have a current licence but have not undergone refresher course must be subjected to refresher course before such personnel are allowed to exercise the privileges of the licence including grant of approval to function in the QC department.

2.2 holding shop approval / structural repair of aircraft, issued by an organisation as per approved scope where they are employed

2.3 holding certificate of competency (excluding welding) as per approved scope held by the organisation where they are employed

Guidelines contained in this advisory circular are effective from 1st July 2001

3 EXEMPTION FROM REFRESHER TRAINING

The following personnel are exempted from undergoing refresher course provided they do not exercise the privileges of the licence held by them in respect of Indian registered aircraft.

- a. Senior Executives such as MD/ Deputy MD/ Chairman/ Directors of an organization.
- b. Personnel employed in Foreign Airlines
- c. Instructors of AME Training Institutes including institutes imparting type training.
- d. Personnel employed in organizations approved in Category 'F' only.
- e. Welders holding Certificate of Competency.
- f. Member of the flying crew.

4 PROCEDURE

The procedure for conducting refresher training for AME licence/ Approval/ C of C holders may be detailed in the Quality Control Manual/ Training Manual (where applicable).

It will be the responsibility of the organization that persons holding AME licence/ C of C undergo refresher course as said above before forwarding applications to DGCA for renewal. A copy of the certificate for having undergone refresher course may be enclosed along with the application for renewal

Similarly the organisation will ensure that approval holders undergo refresher course at least once in twenty-four months before effecting renewal of the approval.

Refresher courses may be conducted by the individual maintenance organisations that have the necessary infrastructure.

Small organizations such as flying club/ private operators who have employed few number of AME licence/approval/C of C holders (excluding welders) and do not have the required infrastructure to conduct refresher course on their own may conduct refresher courses jointly with similar organisations. Such arrangement should have prior concurrence of the local Airworthiness Office. Where necessary, the local Airworthiness Office may provide assistance for conducting such refresher courses.

There need not be any formal examination at the end of the refresher course. These refresher courses can cover field trips also for highlighting maintenance procedures. Suitable handouts may also be distributed to the participants for their information wherever required.

5 SYLLABUS

The duration and syllabus of refresher course may be laid down by the Quality Control Manager/ training departments of the operator for holders of various categories of AME licence/approval/ C of C in consultation with the concerned Regional/Sub-Regional Airworthiness office. Following are the general guidelines for the syllabus to be followed for the refresher training:

- (i) Revisions to Aircraft Rules, CAR & AAC
- (ii) Amendments to the Quality Control Manual,
- (iii) Any changes in the Organisation set up
- (iv) DGCA Mandatory Modifications issued/revised/cancelled.
- (v) Significant Service Bulletins/ Service Information Letters/ and any changes to manufacturers documents such as Maintenance Manual/ Maintenance Planning Document/ Structural Repair Manual/ Component Maintenance Manual etc
- (vi) Any changes to the approved inspection schedules/procedure sheets.

- (vii) Significant topics such as RVSM/ ETOPS/ Cat II & III operations / MNPS/ BRNAV/ EGPWS (where applicable)
- (viii) Accidents (relevant to the fleet) - reasons, in-service and industry experience, Court recommendations and action taken thereof.
- (ix) Incidents, their cause and remedial action, prevention thereof, action taken against erring personnel.
- (x) Defects – Review of defects encountered with Industry averages, analysis of repetitive defects, causes and remedial actions taken.
- (xi) Maintenance Mistakes/ Human Factors - Mistakes & technical faults due to use of improper tools/equipments, substandard procedures, how to avoid them, do's - don'ts, emphasis on good maintenance practices, maintenance staff and crew co-ordination etc.
- (xii) Suggestions for improving Dispatch reliability, maintenance standards etc
- (xiii) Amendments/revisions to MMEL/MEL
- (xiv) Findings of internal/external audits.
- (xv) Any other airworthiness safety related issues.

Note: Manufacturing organizations shall lay emphasis on topics relating to design and manufacturing aspects, changes in Type Certificate/STC, incident/ accident due to manufacturing defects, etc.

6 MAINTENANCE OF RECORDS.

Each organization should maintain a record of refresher courses in respect of each AME licence/ approval/ C of C holders till the AME licence/ approval/ C of C holder is in their employment This record may be made available to DGCA officials for scrutiny as and when required..

Regional/Sub Regional Airworthiness offices will monitor adherence to the requirements of the refresher courses.

Sd/
(L A Mahalingam)
Director of Airworthiness
for Directorate General of Civil Aviation



AAC NO. 3 of 2001
Date: 7th March, 2001

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: BANNER TOWING OPERATIONS

1. INTRODUCTION:

In many countries, banner towing is undertaken as an effective means of advertising. Some operators have shown interest in engaging in this activity in India. Before permitting banner towing using single engine aeroplanes with all up weight (AUW) not exceeding 3000 kg., certain guidelines have to be complied with to ensure that the activity is performed safely and does not cause hazard to public. This circular lays down the guidelines and procedures for performing banner towing operations.

2. APPLICABILITY:

Only single engine aeroplanes whose AUW does not exceed 3000 kg shall be used for banner towing.

3. CANCELLATION:

Airworthiness Advisory Circular No. 8/98 dated 11.9.1998.

4. PROCEDURES FOR OBTAINING APPROVAL FOR BANNER TOWING:

4.1 Banner towing is considered as a commercial activity and shall be performed only by an operator holding Non-scheduled Operator's Permit (NSOP) / Air Operator Certificate (AOC) issued by DGCA, indicating operations specifications for banner towing operations with such aeroplanes as are entered on the permit.

4.2 Engineering Requirements:

4.2.1 Only those aeroplanes will be used for banner towing that have been duly modified for the purpose including tow attachment and release mechanism as per the S.B./mod approved by the country of design/ manufacture or by the DGCA. The operator should furnish full details of the modification proposed to be carried out on the aeroplane for banner towing operations. This information

should include aeroplane make and model. The details of the banner design as well as the combination of the aeroplane and the banner shall be examined by the DGCA before granting approval.

4.2.2 The cockpit should be suitably placarded to indicate approved maximum aeroplane speed during banner towing. For this purpose, the maximum aeroplane speed, prescribed by the manufacturer for banner towing should be adopted. In the absence of manufacturer's recommendations, the optimum approach speed for the aerial pick up of the banner is 1.1 to 1.2 times the best rate of climb speed. Procedures, operating limitations and restrictions prescribed by the equipment manufacturer in respect of launching, towing and release and retrieval of banner should be followed.

4.3 **Weight and Balance of Aeroplane and Equipment Maintenance Requirements:**

4.3.1 The weight and balance of the aeroplane with banner towing equipment installed on the aeroplane shall be prepared by the operator and submitted to DGCA for approval.

4.3.2 Inspection schedule of the aeroplane for banner towing to be signed by appropriately licensed AME shall be prepared by the operator and submitted to the DGCA for approval.

4.3.3 A thorough inspection of the aeroplane and special equipment shall be made prior to each day's operations by AME in accordance with DGCA approved inspection schedule.

4.3.4 All operating limitations shall be placarded suitably in the cockpit.

4.3.5 The safety link which is a weak link for providing safe towing operations should be closely checked following each flight.

4.4 **Operations Requirements:**

4.4.1 These operations shall not be carried out over the congested area of a city, town or settlement or over any open air assembly of persons at altitudes lower than 1000 ft above the highest obstacle within a horizontal radius of 2000 ft. of the aeroplane. Aerobatic maneuvers shall not be permitted during banner towing operations.

4.4.2 Only essential crew members will be carried during banner towing operations. Carriage of passengers on a banner towing flight is prohibited.

4.4.3 Banner towing operations shall be restricted to hours between sun-rise and sun-set.

4.4.4 Banner towing operations shall not be conducted unless the cloud ceiling is at least 1500 feet and the visibility at least 5 kms.

- 4.4.5 The operator shall obtain prior permission from the ATC (Air Traffic Control) to conduct banner towing operations.
- 4.4.6 When banner towing operations are conducted around congested areas due care should be exercised, so that in the event of emergency release of the banner and/ or tow rope, it will not cause undue hazard to persons or property on the surface.
- 4.4.7 The tow rope will be dropped only in a pre designated area which is atleast 500 ft from persons, buildings, parked automobiles and aeroplanes. If the tow plane lands with the rope attached, due care should be exercised to avoid trailing the rope and endangering the other aeroplanes in the air, or persons, property or aeroplanes on the ground.
- 4.4.8 Satisfactory coordination of ground crew signals can be critical to banner towing operations. Ground crews layout the banner, elevate the top of the lead pole for pick up, retrieve the banner after the drop, and, if necessary, signal the correct approach to the pilot. In order to perform these functions satisfactorily, the ground crew should be trained properly by the operator.
- 4.4.9 Operations manual of the operator shall be suitably amended to incorporate banner towing operations prescribing detailed procedures, aeroplane makes and models, pilots qualifications and training, operating limitations, etc.

5. Pilot Competency Requirements

- 5.1 The pilot should hold at least a CPL with an appropriate category and rating and should have at least 250 hours of flying experience as PIC on the type of aeroplane and a minimum of 10 hours on the type within the preceding 90 days. The operator should ensure that the pilot is properly trained and competent to perform banner towing operations.
- 5.2 The pilot should familiarize himself with the procedure of banner towing under the supervision of a CFI / FII who himself is qualified and competent to perform banner towing operations, and should certify in writing in the pilot's log book that he has read and understood the special provisions and received training in respect of banner towing operations. The CFI should also certify and record in the pilot's log book that the pilot has been imparted training in banner towing operations. Proforma as given in Annexure 1 may be used for banner tow pilot training. The training should consist of at least 5 pickups and 5 drops of banners of various sizes including at least one pickup and drop of a banner having maximum sized letters or panels intended to be dropped in such operations. This training should have been accomplished within the past one year and he must have executed at least one pick up and drop within the preceding six months for the purpose of recency of operational experience in banner towing.
- 5.3 The pilot should be trained and be proficient in flying clear of the area when there is power loss in engine with banner still attached or released to avoid injury to persons or damage to property on the ground.

5.4 If a pilot has not carried out banner towing operation in the preceding 6 calendar months, he should undergo adequate training in banner towing on the type of airplane. The CFI should certify that the pilot has undergone adequate training and the same should be recorded in the pilot's log book.

5.5 If a pilot has not carried out any banner towing operation in the preceding 12 calendar months, he should undergo training in banner towing as per para 5.2.

6. **CFI/ FII Competency Requirements**

CFI/ FII must undergo training as per para 5.2 and obtain DGCA approval for banner towing operation and for imparting training in banner towing. For this purpose, he shall produce the necessary certificates/ documentary evidence regarding the training.

7. **DGCA Approval**

DGCA on determining satisfactory compliance with the above requirements may endorse the banner towing operations in the AOC/ NSOP of an operator to carry out banner towing operations prescribing the aeroplane make and model. If at any time it comes to the notice of the DGCA that unsafe conditions exist or these operations are being carried out jeopardizing safety, DGCA may suspend or revoke or cancel the permission.

Sd/-
(N. RAMESH)
Deputy Director General of Civil Aviation

BANNER TOW PILOT TRAINING		
NAME OF OPERATOR :		PILOT'S NAME:
GROUND		
Aircraft Type		
	Date	Instructor
Fuel System		
Aircraft Speeds		
Preflight Procedures (including banner towing procedures)		
Special Certification Provisions		
FLIGHT		
Full Stalls (if appropriate)		
Flight At Critically Slow Airspeeds		
Maximum Performance Maneuvers		
Emergency Procedures: 1) Failure of banner release system 2) Loss of rudder control 3) Partial power loss 4) Engine failure with banner		
Total Ground Hours		
Total Flight Hours		
Pilot's Signature: _____	CFI's / FII's Signature: _____	
Date: _____	Date: _____	
Licence No. : _____	Licence No. : _____	



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO. 5 of 2001
Date: 3rd July, 2001

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: ENGINEERING STATISTICS REPORT

INTRODUCTION

Civil Aviation Requirements (Section 2 – Airworthiness) Series “A” Part III lays down that scheduled, non-scheduled and private operators should furnish certain data at specified intervals to DGCA.

Civil Aviation Requirements (Section 2 – Airworthiness) Series “C” Part III further lays down that operators issued with permit to carry out scheduled air transport services, should prepare a monthly report in respect of fleet performance and engineering statistics to determine the reliability of aircraft systems and components. Similarly non-scheduled operators are required to submit The ESR at specified intervals as mentioned below.

PURPOSE

The purpose of this requirement is to analyze the statistical data, observe the performance of the aircraft and its systems, identify any deficiency in the basic design in a component or in the layout of a system or in the maintenance practices followed by the operator. If required, based on the observations/ findings, the operator is expected to take necessary steps to make good the deficiencies so that the reliability of the aircraft systems and components is satisfactory and an acceptable level of operational reliability and safety has been achieved.

This Advisory Circular details the type of information, method of presentation and the frequency at which each operator is required to submit the fleet performance and Engineering Statistical Report (ESR). To achieve uniformity and standardization in the manner of presentation of the monthly ESR with necessary data, a specimen/ sample monthly report for a scheduled operator, nonscheduled operator and private operator is enclosed.

FORMAT OF ESR

Appendix I gives the format for scheduled operator
Appendix II gives the format for non-scheduled operator
Appendix III gives the format for private operator

CONTENTS OF REPORT

The ESR may be divided into three parts. Each part will contain the following minimum datas according to the size and type of fleet:

Part 1- this part is general and will contain a brief introduction to the ESR of the operator, distribution list, and glossary of terms/ definitions used in the report as applicable to individual operator.

Part 2 –This part will include the entire fleet registration details for the period under review.

Part 3 - This part may be divided into number of sections according to the type of aircraft and each section will contain aircraft operating summary for the particular type of aircraft, summary of mechanical delays (15 minutes and above) ATA chapter wise, cancellation / diversions of flight, details of engine premature removals, engine IFSD , premature removal of APU , summary of system reliability ATA chapter wise, summary of system performance, summary of unscheduled component removal, details of CVR/FDR removal, release of aircraft under MEL, auto land system reliability, ETOPS status etc.

In addition to the numerical data, a Bar Chart/ graph corresponding to each type of aircraft fleet on the following will also be furnished in the ESR:

- a. Average daily utilization of aircraft- This bar chart will be a rolling one, by which it can compared the utilization of the type of aircraft fleet for example, the chart for the month of June will give the data from January to June.
- b. Hours/ Cycles logged by the type of aircraft- this bar chart will be prepared as per aircraft type & registration wise.
- c. Engineering defects, Aircraft registration wise;
- d. Engineering defects ATA system wise
- e. The system reliability-This will be a linear graph and there will be individual graph for each ATA Chapter.

In addition to the above, it is desired that wherever possible, data should be provided in the form of bar chart and in rolling form. For example the Statistical Report for the month of May 2001 should not only give data in the form of bar chart for that particular

month, but the information should be available for previous months commencing from January 2001 in the same bar chart. This will help in analyzing the trend at a glance instead of referring to previous month reports and will help further analysis.

PROCEDURE OF SUBMISSION OF ENGINEERING STATISTICAL REPORT

The operators/ AMOs are required to prepare the engineering statistics report at an interval mentioned below and evaluate it for any shortcomings that requires immediate corrective action to be taken to arrest the same. The copy of the ESR may be submitted alongwith details of shortcomings/ deficiencies, if any and corrective action taken to made good the deficiencies, regularly to the concerned Regional/ Sub-Regional Airworthiness Office of the DGCA and DGCA Hqrs. by 30th day of the following month as detailed below:

Scheduled Operator - every month

Non-scheduled Operator- every three months

Private operator - every six months

Sd/-
(L.A.Mahalingam)
Director of Airworthiness
For Director General of Civil Aviation

ENGINEERING STATISTICS REPORT

[Appendix I](#) - gives the format for scheduled operator

[Appendix II](#) - gives the format for non-scheduled operator

[Appendix III](#) - gives the format for private operator



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO 4 of 2003
Date: 30th October 2003

AIRWORTHINESS ADVISORY CIRCULAR

**SUBJECT: Return to Service of Aircraft items - Recovered from
the aircraft involved in Accidents/Incidents.**

1. INTRODUCTION

This Airworthiness Advisory Circular (AAC) gives the guidance of establishing the acceptability of aircraft items recovered from the aircraft involved in an accident/incident and states the conditions to be met before such items may be returned to service.

- 1.2 This Headquarter receives request at times seeking permission for use of aircraft instrument/equipments from the aircraft, which has been involved in an accident/incident. Though such items may not manifest any visual evidence of damage, distortion or change of characteristics a serious airworthiness hazard could result from their use without special precautions being taken as detailed in the AAC.

2. ESTABLISHING THE ORIGINS OF RECOVERED ITEMS

- 2.1 When an aircraft has been involved in an accident/incident, the title to the salvage may pass from the insured owner to other person (e.g. aircraft insurers) and this salvage may be offered for sale either complete or as separate aircraft item in an "as is where is" condition.

While some of the items may be totally unaffected by the accident/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.

- 2.2 All such items must therefore be subjected to an assessment and inspection by a competent person/agency 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, before overhaul and re-installation can be considered.
- 2.3 If the crash load has been above the proof strength, the residual strain remains which may reduce the effective strength of the item or otherwise impair its functioning. Loads higher than this may of course damage the item. Further, a reduction in the strength may be caused by virtue of change of a materials characteristic following overheat from a fire. It is therefore considered utmost important to establish that the items neither cracked, distorted nor 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 evidence of overheating would call for a laboratory investigation.
- 2.4 The standard procedure appropriate to items removed for overhaul following service life may not therefore be considered sufficient for the items from the salvage aircraft. If the information in the manufacturer manual or other technical publication is insufficient to deal with the situation detailed above then the manufacture must be consulted for guidance.

3. INFORMATION REQUIRED FROM AVIATION INSURERS

Aviation insurers and other persons who obtain title to salvage parts may supply to salvage purchasers the details of the accident/incident leading to aircraft or aircraft item, being declared as salvage. It is also common practice for aviation insurer to pass over the airworthiness records to the salvage purchaser. Whilst such information and records are an essential part of the assessment, where return to service is considered, they are not a guarantee that the item is acceptable for re-installation.

No operator should use any item/equipment of the aircraft, which has been involved in an accident/incident without observing the above detailed procedures and the permission of the DGCA Headquarters. The operator should forward their request seeking permission for use of item/equipment of the accidental aircraft through respective regional office ensuring the above procedure.

Sd/
(P.K Chattopadhyay)
Deputy Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO 2 of 2004
Date: 4th October 2004

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: Routine Readout and maintenance of FDR/DFDR units installed on Aircraft.

1. Applicability:

The fitment of FDR/DFDR is made mandatory in twin-engine aircraft where STC is available or where the manufacturer has included this equipment as a part of the Type Certificate.

2. Action Required:

2.1 In order to ensure that the recording integrity of FDR/DFDR units for carrying out investigation of accidents /incidents and for monitoring the performance of aircraft systems and the performance of flight crew with regard to adherence to operation limitations given in the flight manual, the following action is required:

2.2 All operators are required to carry out an FDR/DFDR readout at their own or any approved facility as per the frequency given in this AAC for each serial number of the unit operated by them. Proper records are to be maintained for the readouts and evaluation carried out by the operator, which should be authenticated by the QCM for satisfactory recording and for completion of the specified hours of the FDR spool. The calibration chart for the foil type FDR already installed must be available in order to enable proper decoding and interpretation of the results.

2.3 One copy of each DFDR readout and FDR foil, after evaluation by the operator as required by para 2.1, may be forwarded to DGCA Hqrs (Attention Sh. R. Chinnadurai, Dy. Director R&D), Technical Centre, Opposite Safdarjung Airport, New Delhi 110 003 for carrying out a confirmation test on the proper recording and calibration of FDR/DFDR. The FDR foil or the readout should be clearly marked with the following information:

- 1) Model and the Serial number of the FDR/DFDR unit
- 2) Regn. marking of the aircraft on which installed period of operation

2.4 While evaluating the readout, amongst other aspects, the following aspects should be checked:

- (a) Recording of all parameters
- (b) Continuity of Data
- (c) Whether the parameters recorded are realistic for the particular phase of flight.
- (d) Excedance of critical parameters such as EGT, Engine RPM / vibration, Engine oil pressure, rate of climb/descent, 'g' values during cruise and landing, and any other parameter exceedance which may affect the safety of aircraft.

2.5 Whenever malfunctioning or unsatisfactory recording is observed during the in-house performance check, immediate corrective action should be taken by the QCM and proper record of removal and corrective action taken should be maintained.

3. Standardization of life of FDR :

3.1 Overhaul life for the following FDR unit has been fixed as below:

Type of FDR	Maintenance Programme	Periodicity (In hours)
Sunstrand 573A	Hard Time	6000
Sunstrand 980-4100	Hard Time	6000
Lockheed 209	Hard Time	B/C 4000 O/H 15000
Fairchild 17M800	Hard Time	B/C 4000 O/H 8000
Fairchild SS FDR	On Condition	B/C 4000
BUR-1	Hard Time	F/C 500 B/C 1000 O/H 2000

3.2 Such of those operators who have an approved TBO less than proposed above for the particular type may be permitted to develop the life as per approved life development programme in phases.

3.3 All operators are advised to note that while proposing the periodicity, nature of maintenance and life of major components, manufacturers recommendations should be given overriding consideration. The life followed by other operators using similar type of unit by the same manufacturer should be considered to standardize life limitation in respect of equipments/components.

4. Requirements.**I. SCHEDULED OPERATORS****(i) Tape based recorders**

FDR monitoring frequency -90 days

(ii) Solid State recorders

DGCA officials (Flight Recorder Lab) will carry out Random sampling of flight data obtainable from the recorders (FDR) installed on various aircraft.

II. NON SCHEDULED OPERATORS**(I) Tape based recorders**

FDR monitoring frequency -90 days

(ii) Solid State recorders

FDR monitoring frequency - 365 days/ 1 year

In addition DGCA officials may carry out Random milking from non scheduled operators at any time of choice.

5 This supersedes Airworthiness Advisory Circular No. 2 of 2003, dated 17th January 2003.

Sd/-
P.K. Chattopadhyay
Joint Director General of Civil Aviation



AAC NO 3 of 2004
Date: 04th Oct 2004

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: Routine Readout and maintenance of CVR units installed on Aircraft.

1. Applicability

The fitment of CVR is made mandatory in twin-engine aircraft where STC is available or where the manufacturer has included this equipment as a part of the Type Certificate.

2. Recording Integrity of the CVR units

2.1 In order to ensure the recording integrity of the CVR units for carrying out investigation of accidents/incidents and the performance of flight crew with regard to adherence to cockpit checklists, the following actions are required:

2.2 All operators are required to carry out a CVR readout at their facilities as per requirements given in this circular for each serial number of the CVR unit operated by them. Proper records are to be maintained for the readouts carried out which should be authenticated by the QCM. In addition, all operators are required to send one copy of audio cassette containing recording of each CVR to DGCA hqrs. (Attn: Shri R. Chinnadurai, Dy. Director of R&D), New Delhi for technical and operational evaluation of the recordings of each CVR. The cassettes should be clearly marked with the following information:

Type, Model and Serial number of CVR unit,

Registration of the aircraft,

Flight number

Date of operation

Names of flight crew

The operators may, if required, bring the CVR unit to DGCA Hqrs. on working days for spot evaluation.

2.3 Whenever any malfunctioning or unsatisfactory recording is observed during the in-house performance check, immediate corrective action should be taken by the QCM and proper record of removal and corrective action taken should be maintained.

3. Deactivation of bulk erase facility

3.1 The Cockpit voice Recorder have built in bulk erase facility and recordings recorded in the CVR unit can be erased by means of a switch located in the cockpit. To ensure that the recordings in the CVR unit are available at all time for the purpose of monitoring flight crew performance, investigation of incidents/accidents. etc. DGCA vide letter no. 11-690/93-AI(2) dated 7th December, 1993 had advised all regional offices to ensure deactivation of bulk erase facility. It has been observed that some of the operators have deactivated the said facility by removing the wire from the connector leading to the bulk erase card on the CVR unit. In such cases the CVR unit retains the bulk erase capability.

3.2 To ensure positive deactivation of the bulk erase system, the bulk erase deactivation shall be carried out by removing the relevant card from the CVR unit.

3.3 Necessary log book entries shall be made in the Radio log book for reflecting the above work done.

4. Standardisation of life of CVR

4.1 Overhaul life for the following CVR unit has been fixed as below with immediate effect irrespective of any other stipulations.

Type of CVR	Bench check	Overhaul life
Fairchild Model A-100/100A/ECIL-MRU	1500 flight hours	6000 flight hours
Sunstrand unit (Pt No. 980-6005-074/076)	-do-	-do-

Note : The above is not applicable for Solid State CVR.

4.2 Such of those operators who have an approved TBO less than 6000 hours may be permitted to develop the life as per approved life development program.

4.3 During bench check carry out at least the following

- a) Clean the interior of the unit with special emphasis on cleaning of the roller, pressure pad etc.
- b) Clean the heads.
- c) Inspect the tape for satisfactory condition.

4.4 All operators are advised to note that while proposing the life of major components, the components manufacturer's recommendations should be overriding consideration. The life followed by other operators using similar type of units by the same manufacturer should also be borne in mind to ensure standardization of overhaul life of components.

5. Requirements.**I. SCHEDULED OPERATORS****(i) Tape based recorders**

CVR monitoring frequency -30 days

(ii) Solid State recorders

DGCA officials (Flight Recorder Lab) will carry out Random sampling of flight data obtainable from the recorders (CVR) installed on various aircraft.

II. NON SCHEDULED OPERATORS**(i) Tape based recorders**

CVR monitoring frequency -30 days

(ii) Solid State recorders

CVR monitoring frequency - 180 days

In addition DGCA officials may carry out Random milking from non scheduled operators at any time of choice.

6. This supersedes Airworthiness Advisory Circular No. 3 of 2003, dated 17th January 2003.

Sd/-
P.K.Chattopadyay
Joint Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO 3 of 2006
Date: 8th September 2006

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: AUTHENTICITY AND SERVICEABILITY OF AIRCRAFT PARTS

1. INTRODUCTION:

- 1.1 Sub rule (2) of Aircraft Rule 53 requires that all materials used in those parts of an aircraft which are essential for its safe operation shall conform to approved specifications. This Airworthiness Advisory Circular (AAC) gives the guidance of establishing the authenticity and serviceability of aircraft parts. This AAC gives in detail regarding the approved and unapproved parts, supporting documents for approved parts, precautions to prevent inadvertent acceptance of unapproved parts and reporting the same if received, means to use aircraft parts removed from unserviceable aircrafts and disposal of scrapped parts.
- 1.2 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.
- 1.3 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 AAC is in conformance with Volume II of the ICAO Document 9760 – Airworthiness Manual and provides guidance for the establishment of such a system.

2. APPROVED PARTS:

- 2.1 An approved part is one meeting approved design data applicable to that part and which has been manufactured and subsequently maintained in accordance with the requirements of the State of Design, Manufacture or Registry, as applicable.

Note.— Parts approved pursuant to 2.1 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.

- 2.2 Standard parts such as fasteners are considered as approved parts when they are in accordance with an approved or accepted standard and when referenced in the type design of the particular aircraft.

3. UNAPPROVED PARTS:

Parts not meeting the criteria described in 2.1 and 2.2 are considered to be unapproved. Unapproved parts also include those parts improperly returned to service, for example:

- a) parts supplied directly to the user by a subcontractor not entitled 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 reached their life limit, including, if applicable, any shelf-life limit.

4. SUPPORTING DOCUMENTATION:

- 4.1 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.

- 4.2 Such documents (for example the FAA Form 8130-3, JAA Form One and the DGCA Form One) 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, compliance or non-compliance with any airworthiness directives, etc.;

- g) the signature and approval reference of the person issuing the document;
and
 - h) whether the part is new or used.
- 4.3 Any part not accompanied by the appropriate documentation would be considered to be unapproved.

5. PRECAUTIONS TO PREVENT THE INADVERTENT ACCEPTANCE OF UNAPPROVED PARTS:

- 5.1 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.
- 5.2 It is always necessary to have secondary defences in place designed to give early warning of unapproved parts prior to their release for fitment. 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.
- 5.3 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.

6. UNAPPROVED PARTS REPORTING:

- 6.1 Systems used by end users, to report to the Manufacturer / Type Certificate holders and DGCA, 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 must be easy and available at all reasonable times. It follows that publicity for the reporting system (and the programmes generally) should be widespread.
- 6.2 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 number and (if applicable) serial number; 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.
- 6.3 At any time a part is deemed to be suspect, it and the accompanying documentation, if any, 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.
- 6.4 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 them might eventually lead to the suppression of a genuine report.

7. PARTS STORAGE AND DISTRIBUTORS:

- 7.1 It is recognized that organisation involved in storage and distribution of parts have a significant influence over the control of unapproved parts. Such organizations have an established commercial role of stocking or obtaining parts, often at short notice.
- 7.2 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, the installer purchasing only from those suppliers having a known satisfactory record provides assurance.

8. PARTS REMOVED FROM AN AIRCRAFT NO LONGER IN SERVICE:

- 8.1 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.

- 8.2 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.
- 8.3 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 8.1, range from a simple external visual inspection to a complete overhaul.

9. PARTS RECOVERED FROM AIRCRAFT INVOLVED IN ACCIDENT/INCIDENT:

- 9.1 When an aircraft has been involved in an accident/incident, the title to the salvage may pass from the insured owner to other person (e.g. aircraft insurers) and this salvage may be offered for sale either complete or as separate aircraft item in an "as is where is" condition. Though such items may not manifest any visual evidence of damage, distortion or change of characteristics, a serious airworthiness hazard could result from their use without special precautions being taken. While some of the items may be totally unaffected by the accident/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.
- 9.2 All such items must therefore be subjected to an assessment and inspection by a competent person/agency 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, before overhaul and re-installation can be considered.

9.3 If the crash load has been above the proof strength, the residual strain remains which may reduce the effective strength of the item or otherwise impair its functioning. Loads higher than this may of course damage the item. Further, a reduction in the strength may be caused by virtue of change of a materials characteristic following overheat from a fire. It is therefore considered utmost important to establish that the items neither cracked, distorted nor 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 evidence of overheating would call for a laboratory investigation.

9.4 The standard procedure appropriate to items removed for overhaul following service life may not therefore be considered sufficient for the items from the salvage aircraft. If the information in the manufacturer manual or other technical publication is insufficient to deal with the situation detailed above then the manufacture must be consulted for guidance.

9.5 INFORMATION REQUIRED FROM AVIATION INSURERS:

Aviation insurers and other persons who obtain title to salvage parts may supply to salvage purchasers the details of the accident/incident leading to aircraft or aircraft item, being declared as salvage. It is also common practice for aviation insurer to pass over the airworthiness records to the salvage purchaser. Whilst such information and records are an essential part of the assessment, where return to service is considered, they are not a guarantee that the item is acceptable for re-installation. No operator should use any item/equipment of the aircraft, which has been involved in an accident/incident without observing the above detailed procedures and the permission of the DGCA Headquarters. The operator should forward their request seeking permission for use of item/equipment of the accidental aircraft through respective regional office ensuring the above procedure.

10. **DISPOSAL OF SCRAPPED PARTS:**

10.1 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 missing or incomplete records;
- f) parts that cannot be returned to an airworthy condition due to exposure to extreme forces or heat (see para 8 above); 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 aging aircraft.

10.2 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.

10.3 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.

11. No operator should use any item/equipment of the aircraft, which is no longer in service or which has been involved in an accident/incident without observing the above detailed procedures and the permission of the DGCA Headquarters. The operator should forward their request seeking permission for use of item/equipment of the accidental aircraft through respective regional office ensuring the above procedure. Other procedures like unapproved parts reporting, disposal of scrapped parts etc. shall be religiously followed in order to ensure continued airworthiness of aircraft and also to prevent unintentional use of unapproved parts.

12. This supersedes Airworthiness Advisory Circular No. 4 of 2003, dated 30th October 2003.



(R. P. Sahi)
Deputy Director General of Civil Aviation



AAC NO 4 of 2006
Date: 21st August 2006

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

SUBJECT: AIRWORTHINESS APPROVALS FOR EXPORTS

1. General:

Civil Aviation Requirements, Section 2 Series 'F' Part XIX and Sub Part L (Export Airworthiness Approvals) of CAR 21 gives requirements for the export approval of new aeronautical products manufactured in India. This Airworthiness Advisory Circular (AAC) is issued to give guidance and procedures for issue of airworthiness approval for the purpose of export of aeronautical products. An exporter of an aircraft or an aeronautical product is normally required to obtain an export airworthiness approval from the regulatory authority of the country in which the aircraft is registered or in the case of a new aircraft or an aeronautical product, the Country of Manufacture. The export approval is normally revalidated by the regulatory authority of the importing country. A number of countries have identified certain special requirements or conditions to which the aircraft or aeronautical product must conform before they will validate the export approval issued by the exporting country. In many cases, information on such special requirements or conditions is not readily available. It is therefore important that the exporter obtain the necessary information on any special requirements or conditions from the regulatory authority of the importing country.

2. Special requirements:

The administrative requirements which must be satisfied as a condition of shipment at the time of export are generally referred to as special requirements, and include, for example, the requirement for an export Certificate of Airworthiness for the aircraft, copies of log books, flight manuals, etc. When a product does not meet the special requirements of the importing country, the exporter should obtain a written statement from the regulatory authority of the importing country indicating acceptance of the deviation. This statement should accompany each application for an export airworthiness approval.

3. Special conditions:

Any additional design requirements considered necessary by the importing State in addition to the requirements of the exporting State to provide a level of safety and environmental quality (including noise) equivalent to what is provided by the importing Country's certification basis are referred to as special conditions. These additional conditions should be included in the Type Certificate data sheet. When any of the special conditions cannot be satisfied, the exporters must obtain a statement from the regulatory authority of the importing country indicating that it will accept the deviation.

4. Classification of products for export:

4.1 For the issue of export airworthiness approval, the aeronautical products are classified as follows:

- a) **Class I product** — a complete aircraft, aircraft engine or propeller which has been type certificated in accordance with the appropriate airworthiness requirements and for which the necessary Type Certificate data sheets or equivalent have been issued.
- b) **Class II product** — a major component of a Class I product, such as wing, fuselage, empennage surface etc., the failure of which would jeopardize the safety of a Class I product or any part, material or system thereof.
- c) **Class III product** — any part or component which is not a Class I or Class II product or a standard part.

4.2 In the case of an aircraft, the export approval is normally issued in the form of an export Certificate of Airworthiness.

For other products, it may be issued in the form of airworthiness approval tags. Both should include, among other things, the conformity certification and should indicate whether the product is new, newly overhauled or used.

Note.- When the term "newly overhauled" is used to describe the product it means that the product has not been operated or placed in service, except for functional testing, since having been overhauled, inspected and approved for return to service in accordance with the appropriate airworthiness requirements.

5. GUIDANCE FOR ISSUANCE OF EXPORT AIRWORTHINESS APPROVALS

5.1. Application For an Export Airworthiness Approval:

5.1.1 A separate application for an export certificate of airworthiness should be made for:

- a) each aircraft;

b) each engine and propeller, except that one application may be made for more than one engine or propeller, if all are of the same type and model and are exported to the same purchaser and country;

c) each type of Class II product, except that one application may be used for more than one type of Class II product when:

1) they are separated and identified in the application as to the type and of the related Class I product; and

2) they are to be exported to the same purchaser and country.

5.1.2 Each application for export certificate of airworthiness of a Class I product should include, as applicable:

a) a statement of conformity, for each new product.

b) a weight and balance report, with a loading schedule when applicable, for all transport aircraft. This report should be based on an actual weighing of the aircraft within the preceding 12 months, after any major repairs or alterations to the aircraft. Changes in equipment not classified as major changes that are made after the actual weighing may be accounted for on a "computed" basis and the report revised accordingly.

Manufacturers of new non-transport aircraft may submit reports having computed weight and balance data, in place of an actual weighing of the aircraft, if fleet weight control procedures approved by the DGCA have been established for such aircraft. In such cases, the following statement should be entered in each report:

"The weight and balance data shown in this report are computed on the basis of DGCA approved procedures. The weight and balance report should include an equipment list showing weight and moment arms of all required and optional items of equipment that are included in the certificated empty weight."

c) a maintenance manual for each new product when such a manual is required by the applicable airworthiness rules;

d) evidence of compliance with the applicable airworthiness directives. A suitable notation should be made when such directives are not complied with;

e) when temporary installations are incorporated in an aircraft for the purpose of export delivery, the application form should include a general description of the installations together with a statement that the installation will be removed and the aircraft restored to the approved configuration upon completion of the delivery flight;

f) historical records such as aircraft and engine log books, repair and alteration schedules / records etc. for used aircraft and newly overhauled products;

g) for products intended for overseas shipment, the application form should describe the methods used, if any, for the preservation and packaging of such products to

protect them against corrosion and damage while in transit or storage. The description should also indicate the duration of the effectiveness of such methods;

h) the aircraft flight manual, when such material is required by the applicable airworthiness regulations for the particular aircraft;

i) a statement as to the date when title passed or is expected to pass to a foreign purchaser; and

j) the data required by the special requirements of the importing country.

The application form for an Export Airworthiness Approval is given as Appendix -1 to this AAC.

6. ISSUANCE OF EXPORT CERTIFICATE OF AIRWORTHINESS FOR CLASS I PRODUCTS:

An Export Certificate of Airworthiness may be issued to an applicant for a Class I product if it can be shown that, at the time the product is submitted to the DGCA for export airworthiness approval, it meets the following requirements, as applicable:

a) new or used aircraft manufactured in the India should meet the airworthiness requirements as stipulated by DGCA and any other special requirements of the importing country;

b) new or used aircraft manufactured outside India should have a valid Certificate of airworthiness;

c) used aircraft should have undergone an annual type inspection and be approved for return to service. The inspection should have been performed and properly documented within 30 days before the date the application is made for an Export Certificate of Airworthiness;

d) new engines and propellers should conform to the type design and should be in condition for safe operation;

e) the engines and propellers which are not being exported as part of a certificated aircraft should have been newly overhauled; and

f) the special requirements of the importing country should have been met.

The format of Export Certificate of Airworthiness for Class I products is given at Appendix – 2 to this AAC.

Note.- : The Export Certificate of Airworthiness issued by DGCA does not constitute authority for flight. In case, Export Certificate Airworthiness is issued by DGCA for transfer of aircraft onto the Register of another State, such a document provides confirmation of a recent satisfactory review of the airworthiness status of the aircraft.

7. ISSUANCE OF EXPORT AIRWORTHINESS APPROVAL TAGS FOR CLASS II PRODUCTS:

An applicant should be entitled to an Export Airworthiness Approval Tag for a Class II product if he shows that:

- a) the product conforms to the approved design data;
- b) the product is in a condition for safe operation;
- c) in the case of a newly overhauled product, it has not been operated or placed in service except for functional testing since having been overhauled, inspected and approved for return to service;
- d) the product is identified with at least the manufacturer's name, part number, model designation (when applicable), and serial number or equivalent; and
- e) the product meets the special requirements of the importing country.

The format of Export Airworthiness Approval Tag for Class II products is given at Appendix – 3 to this AAC.

8. ISSUANCE OF EXPORT AIRWORTHINESS APPROVAL TAGS FOR CLASS III PRODUCTS:

An applicant should be entitled to an Export Airworthiness Approval Tag for a Class III product if he shows that:

- a) the product conforms to the approved design data applicable to the Class I or Class II product of which it is a part;
- b) the product is in a condition for safe operation; and
- c) the product complies with the special requirements of the importing country.

The format of Export Airworthiness Approval Tag for Class III products is given at Appendix – 4.

9. RESPONSIBILITIES OF EXPORTERS

Each exporter requesting an export airworthiness approval for a product should:

- a) forward to the regulatory authority of the importing country all documents and information necessary for the proper operation of the products being exported, e.g., flight manuals, maintenance manuals, service bulletins, assembly instructions, and such other material as is stipulated in the special requirements of the importing

country. The documents, information, and material may be forwarded by means consistent with the special requirements of the importing country;

b) forward the manufacturer's assembly instructions and a DGCA approved flight test check-off form to the Regulatory Authority of the importing country when unassembled aircraft are being exported. These instructions should be in sufficient detail to permit whatever rigging, alignment, and ground testing is necessary to ensure that the aircraft will conform to the approved configuration when assembled;

c) remove or cause to be removed any temporary installation incorporated on an aircraft for the purpose of export delivery and restore the aircraft to the approved configuration upon completion of the delivery flight;

d) secure all proper foreign entry clearances from all the countries involved when conducting sales demonstrations or delivery flights;

e) in such case(s) where the title to an aircraft passes or has passed to a foreign purchaser :

- 1) request cancellation of the current registration and certificate of airworthiness, giving the date of transfer of title, and the name and address of the foreign owner.
- 2) return the Certificate of Registration and Certificate of Airworthiness to the DGCA; and
- 3) Submit a statement certifying that the Country's identification and registration numbers have been removed from the aircraft.



(R.P.Sahi)
Deputy Director General of Civil Aviation

Appendix – 1

APPLICATION FOR AN EXPORT AIRWORTHINESS APPROVAL

DIRECTOR GENERAL OF CIVIL AVIATION	EXPORT CERTIFICATE NO.
APPLICATION FOR EXPORT CERTIFICATE OF AIRWORTHINESS	
Instructions : This application is to be submitted to the DGCA (Two copies) when the product(s) to be exported is (are) presented for inspection. Use Part I for Class I products and Part II for Class II products. For complete aircraft execute items 1 through 11 as applicable. For engines and propellers, omit items 5a) and 6. Part III is for DGCA use only.	

PART I (for Class I Products)						
1. Application is made for an Export Certificate of Airworthiness to cover the product(s) described below, which is (are) : <input type="checkbox"/> New <input type="checkbox"/> Used (aircraft) <input type="checkbox"/> Newly overhauled						
2. Name and address of exporter		3. Name and address of foreign purchaser			4. Country of destination	
5. Description of product(s)						
Type	Make and model	Identification number	Serial number	Spec. number	Operating Time (Hours)	
					Since overhaul	Total
a) Aircraft						
b) Engines						
c) Propellers						
6. The aircraft was given a satisfactory flight test on (date) :						
7. Does the product comply with all applicable DGCA regulations, airworthiness directives and other Airworthiness requirements?					<input type="checkbox"/> Yes <input type="checkbox"/> No (explain in "Remarks)	
8. Have applicable special requirements of the importing country been complied with?					<input type="checkbox"/> Yes <input type="checkbox"/> No (explain in "Remarks)	
9. Has proper preventive treatment been applied to products susceptible to rapid corrosion when being shipped?					<input type="checkbox"/> Yes <input type="checkbox"/> No (explain in "Remarks)	
10. Remarks : (Add extra sheets duly authenticated, if required)						
11. Exporter's certification :						
I certify that the above statements are true and that the product(s) described here is (are) airworthy and in						

condition for safe operation except as may be noted under Item 10 "Remarks", above.		
Date	Signature of applicant or authorized representative	Title

PART II (for Class II Products)					
12. Application is made for approval of aeronautical parts for export as indicated below :-					
13. Name and address of exporter	14. Name and address of foreign purchaser	15. Country of destination			
16. Parts are eligible for installation on : Make and model of Class I product : _____ Spec. No. : _____ _____					
17. The parts are (check one): <input type="checkbox"/> New <input type="checkbox"/> Newly overhauled					
18. The parts are described (check one) : <input type="checkbox"/> By name, part number, and quantity on the attached invoice or packing sheet no. _____ <input type="checkbox"/> Below by name, part number, and quantity. <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; text-align: center;">Name</td> <td style="width: 33%; text-align: center;">Part number</td> <td style="width: 34%; text-align: center;">Quantity</td> </tr> </table>			Name	Part number	Quantity
Name	Part number	Quantity			
19. I certify that the above statements are true and that the product(s) described here is (are) airworthy and in condition for safe operation except as may be noted under Item 10 "Remarks", above.					
_____ Date	_____ Signature of applicant or authorized representative	_____ Title			

PART III - Approval (for AID use only)		
20. It is considered that the product(s) described in <input type="checkbox"/> Part I <input type="checkbox"/> Part II is (are) airworthy and conform(s) to pertinent requirements except as noted in Item 10.		
_____ Date	_____ Signature of AID Inspector	_____ Number

21. _____ approval tags, forms were issued for the parts described in Part II. (Quantity)
22. Export file spot-checked by : <div style="display: flex; justify-content: space-between; margin-top: 10px;"> _____ _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> Date AID Inspector </div>

Appendix – 2

(CONCERNED REGIONAL OFFICE)

EXPORT CERTIFICATE OF AIRWORTHINESS

This certifies that the product identified below and more particularly described in Specification(s) of the Director General of Civil Aviation, Numbered has been examined and as of the date of this Certificate, is considered airworthy in accordance with a comprehensive and detailed airworthiness code/requirement of the Indian Government, and is in compliance with these special requirements of the importing country filed with the Indian Government, except as noted below. This certificate in no way attests to compliance with any agreements or contracts between the sender and purchaser, nor does it constitute authority to operate an aircraft.

This Export C of A does not constitute authority for flight.

PRODUCT: ENGINE INSTALLED:

MANUFACTURER:

MODEL:

SERIAL NO : PROPELLER INSTALLED:

NEW.... NEWLY OVERHAULED..

USED AIRCRAFT:

COUNTRY TO WHICH EXPORTED:

EXCEPTIONS:

(Authorized Signatory)

Dated

* For complete aircraft list applicable specification or Type Certificate Data Sheet numbers for the aircraft, engine, and propellers, applicable specifications or Type Certificate Data Sheet, if not attached to this export certificate, will have been forwarded to the appropriate governmental office of the importing country.

- END -

Appendix – 3

**EXPORT AIRWORTHINESS APPROVAL TAG
(for Class II products)**

(CONCERNED REGIONAL OFFICE)		No. _____
EXPORT CERTIFICATE OF AIRWORTHINESS TAG (for Class II products)		
1. Name and address of exporter	2. Name and address of foreign purchaser	3. Country of destination
4. The parts are eligible for installation on: Make and model Class I product: _____ Airworthiness Spec. No.: _____		
5. The parts are (check one): <input type="checkbox"/> New <input type="checkbox"/> Newly overhauled <input type="checkbox"/> Used aircraft		
6. The parts are described (check one): <input type="checkbox"/> By name, part number, and quantity on the attached invoice or packing sheet no. _____ <input type="checkbox"/> Below by name, part number and quantity		
Name	Part number	Quantity
7. The parts do not meet the applicable DGCA requirements in respect of the following:		
8. It is considered that the product(s) described in Item 6 is (are) airworthy and conform(s) to pertinent requirements except as noted in Item 7.		
_____ Date:	_____ Signature of authorized representative.	



**EXPORT AIRWORTHINESS APPROVAL TAG
(for Class II products)**

(CONCERNED REGIONAL OFFICE)	
EXPORT AIRWORTHINESS APPROVAL TAG (FOR CLASS III PRODUCTS)	
DESCRIPTION OF PARTS	
<input type="checkbox"/> NEW	<input type="checkbox"/> NEWLY OVERHAULED
APPROVAL BASIS	
QUANTITY, NAME AND PART NUMBER	
ELIGIBLE FOR INSTALLATION ON: (T.C. PRODUCT)	
SEE SHIPPER'S INVOICE NUMBER	
INSPECTED AND APPROVED	
AGENCY NAME AND NUMBER	
SIGNATURE OF DGCA REPRESENTATIVE	
DATE	NUMBER



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC NO 2 of 2007
Date: 3rd January 2007

AIRWORTHINESS ADVISORY CIRCULAR

**SUBJECT: CERTIFICATION OF TRANSIT INSPECTION OF AN AIRCRAFT BY
OTHER ORGANISATIONS**

1. INTRODUCTION:

Rule 56 of the Aircraft Rules, 1937 permits aircraft to be maintained on a foreign land by agencies approved for the purpose by the aviation authority of that State in accordance with the requirements of the Convention and recognized by DGCA.

This Airworthiness Advisory Circular (AAC) gives the guidance to the operators and Airworthiness Officers for transit inspections at stations located within or outside India by other approved organizations. Such transit inspection by other organizations is accepted subject to compliance with the procedure specified in this AAC by the operator.

2. PROCEDURE:

- (i) Before contracting transit inspections to other organizations the operator shall ensure that the organization has the necessary infrastructure, manpower facilities etc., for the task. An inspection should be carried out for this purpose and record maintained.
- (ii) The operator desirous of seeking transit inspections being carried out' by other operators should make amendments in their MOE which would be approved by the Regional Airworthiness Office where the operator is based. (The Quality Department of the operator has been delegated the responsibility to ensure that the organization carrying out the transit inspections meets the applicable requirements laid down by the manufacturer and / or DGCA).
- (iii) The operator shall ensure that the organization carrying out transit inspection has FAA / EASA / State CAA approval for maintenance of the type of aircraft.

- (iv) The certifying staff should be appropriately qualified and approved for the inspection, with a minimum one-year experience for the task they would certify.
- (v) The transit inspection contract with the external organization shall be documented, detailing the terms of contract and organization responsibility.
- (vi) The operator's procedures in terms of documentation, AMM, MOE etc., shall be provided by the operator to the organization.
- (vii) Procedure for reporting of delays, incidents and accidents is documented and provided to the inspecting organization.
- (viii) MEL and its preamble should be provided by the operator to the inspecting organization for its correct use.
- (ix) The operator should audit the facilities once in two years to ensure continued capability of the contracted organization.
- (x) Any discrepancies, affecting airworthiness and safety should be brought to the notice of DGCA along with action taken by the operator against the organization and to avoid recurrence of the lapse.
- (xi) DGCA approval for outsourcing Transit inspections to outside organizations may not be required.



(R. P. Sahi)/ Deputy Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC No 2 of 2011
Date 20th September 2011

AIRWORTHINESS ADVISORY CIRCULAR

Sub: - Categorization of Surveillance/ Audit findings.

- 1. Introduction** – After accomplishment of any Surveillance/ Audit it always remains a challenge for Inspecting officer/ Auditor to translate the various observations into findings and to categorize them in appropriate level. This can be done effectively by understanding the impact of non compliance in functioning of organization. The impact of non compliance could be isolated and localized to one particular area or wide spread having cascading effect throughout the functioning of organization. As all the levels of findings are categorized considering their impact in the degradation of safety standards. Therefore, their careful study and analysis are of paramount importance.
- 2. Purpose** – This AAC is issued to provide a general guideline to the inspecting officer/ auditor to appropriately level the surveillance/ audit findings.
- 3. Findings:** -

Any non compliance with the applicable requirement which can be categorized into different levels e.g. Level 1 & Level 2.

Level 1 – A level 1 finding is any significant non-compliance with the applicable requirement which lowers the safety standard and hazards seriously the flight safety.

Level 2 - A level 2 finding is any non-compliance with the applicable requirement which could lower the safety standard and possibly hazard the flight safety.

In general findings which are resulting due to system failure and having direct impact in degradation of safety standard are considered as Level 1. Level 1 finding requires immediate attention and rectification. All other findings other than level 1 are considered as level 2 and shall be rectified within stipulated time period.

4. Procedure

Objective of any Surveillance/Audit is to verify compliance of applicable requirements. Therefore, Inspecting officers/Auditors should satisfy themselves about the means of compliance demonstrated by organization. Wherever compliance action is not satisfactory / acceptable, findings should be generated. After completion of Surveillance / Audit all findings should be discussed/ reviewed at appropriate level for their proper categorization.

If surveillance findings are not properly categorized/ addressed there could be a chance of latent degradation in system of organization functioning which may manifest as safety hazard over the period of time. Therefore, sufficient care should be taken to categorize the findings.

For guidance some of the sample level 1 and level 2 findings are given in Appendix - I. Inspecting officers/ auditors are expected to go beyond the list and should use their considered opinion/ judgment for proper categorization of findings.

**Sd/-
(Charan Dass)
Joint Director General of Civil Aviation**

Examples to Clarify level 1 and Level 2 findings during surveillance

1. Any system lapse shall be treated as level 1

Eg:- Audit System, Audit procedures, Quality plan not prepared and quality assurance system is not in place shall be treated as level 1. All these issues have to be taken up while the initial approval of organization is given.

Any lapse from procedures should be treated as level 2.

Eg: - Procedure lapse such as audit is not carried out as per schedule in two occasions etc. should be treated as level 2.

2. Failure to comply with any AD's and ASB shall be treated as Level 1.
If procedure for the same is not documented, then it is Level 2
3. No control over Life limited parts shall be treated as Level 1.
If procedure for the same is not documented, then it is Level 2.
4. Aircraft is not maintained as per the approved maintenance program shall be treated as level 1.
5. Items of inspection not signed by AME on maintenance inspection schedules and given CRS shall be treated as Level 1
6. Airworthiness limitation Items (ALI / AWLI) / Certification Maintenance Requirements (CMR) items are not included into Aircraft Maintenance program (AMP) shall be treated as level 1. If they are not identified in the AMP, then it is level 2.

CMR* (task interval cannot be adjusted) Items are not carried out within the specified time limit, shall be treated as level 1. In case of CMR** (Task interval can be adjusted) items not carried out within the specified interval should be level 2.

7. Any tool used for maintenance is not calibrated shall be treated as Level 1
8. No Production planning system found established and same resulted in failure of maintenance of Aircraft shall be treated as Level 1.
9. All post holders are missing shall be treated as level 1,
One post holder is missing should be level 2.
10. Documents required on board not found on board like C of A, ARC etc shall be treated as Level 1
11. Explosive certificates not renewed by AFS shall be treated as Level 1
12. Conditions imposed on the organization to operate under limitations not followed, shall be treated as level 1.



AAC No 1 of 2012

Date 6th February 2012

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: - Duty Time Limitation – Aircraft Maintenance Personnel (AMP)

Introduction:

The aviation maintenance system is heavily dependent upon people being able to perform their jobs reliably and efficiently. The advent of modern industrial processes, the globalization of the economy, and the proliferation of information technology, among other factors, have contributed to the creation of a 24-hour society in recent times. As the demand for 24-hour availability of goods and services has risen over the past few decades, the prevalence of shift work has likewise increased. Further the opportunity to work abroad and constant migration to pursue better avenues by Aircraft Maintenance Personnel (AMP) have brought a great challenge for managers to manage the shift optimizing the available manpower resources. Managing the shift with shortage of maintenance personnel should have obvious outcome of over-stressing the individual and development of fatigue. At times, such fatigue development if not suitably addressed can become contributory factor for casual approach in maintenance which may lead to human error. Often, various incident and accident investigation report has attributed human error as a weakest link in the safety chain and without attention can become safety hazard.

Therefore, it is advisable that in line with pilot and Cabin crew every organization should frame policy for AMP duty time limitations and adequate rest period.

Whilst this AAC has been prepared primarily for those who are engaged in aircraft maintenance certification activities, however, it is also relevant to all other personnel related with aircraft maintenance. The term Aircraft Maintenance Personnel (AMP) used in this circular is generic and beside certifying personnel may also include technicians, inspectors, supervisors, managers and planners associated with the aircraft maintenance.

Purpose:

Though there have been Duty Time Limitation (DTL) prevalent for Pilot and Cabin crew for some considerable time but no serious thought has been perceived in this area for Aircraft Maintenance Personnel (AMP). Purpose of this AAC is to highlight the major concerns in the area of DTL for AMP and to provide guidelines to Aircraft Maintenance Organization (AMO) to frame policy to address the issue without prejudice to any other requirements.

While framing the policy for Duty Time Limitation the factors affecting the physical and mental performance should be looked into to avoid any mistake/error in maintenance committed by AMP which may lead to jeopardize the airworthiness and safety of aircraft.

Human Performance and Degradation:

The Aircraft Maintenance Personnel (AMP) are the central part of the Aircraft maintenance system. It is therefore, very useful to have an understanding of how various parts of their body and mental process function and how performance limitation can influence their effectiveness at work.

The physical and mental human performances are dependent upon vision, hearing, capability of information processing, attention and perception, memory, judgment and ability of decision making.

The physical ability of the AMP could be impaired/ limited by unhealthy working environment, improper lighting arrangement and adverse environmental conditions like extremely hot hanger, rain, cold, etc.

Mental ability of AMP is likely to degrade and eventually fall under certain level if affected by fitness of health, accumulation of stress (domestic/work related), time pressure and deadline to accomplish any work and lack of concentration.

“Tiredness and fatigue can adversely affect performance. Excessive hours of duty and shift working, particularly with multiple shift periods or additional overtime, can lead to problems. Individuals should be fully aware of the dangers of impaired performance due to these factors and of their personal responsibilities.”

Shift work:

Shift work can be defined as any arrangement of daily working hours that differs from the standard daytime hours. As most of the Aircraft maintenance activities are undertaken by shift system therefore impact of shift work in the behavioral pattern of AMP

while carrying out maintenance work should be understood and taken cognizance. The nature of shift systems can vary widely along several dimensions, including the number and length of shifts, the presence or absence of night work, the length of the shift cycles, the start and stop times of each shift, and the number/ placement of days off.

The individual who regularly work atypical hours is at greater risk for physical and psychological impairment or disease than typical day worker. This risk is assumed to originate from the physical and psychological stress that develops from work schedule-related disruptions of their biological functions, sleep, and social and/or family life. Considering Aircraft maintenance and servicing is a Safety Critical occupation with a direct link in the chain of events that can lead to a major aircraft incident/ accident, relationship between shift work and health and safety should be adequately addressed by all organizations.

Following factors which advocates DTL for AMP should be taken cognizance by all organization to avoid any fatigue related error of AMP as contributory factor for weak link in safety chain.

Effect of shift work on health:

For sustaining operational requirement, many organizations have to maintain round the clock Aircraft maintenance activities and therefore to maintain 24 hrs, 7 days shift system. The maintenance personnel who are working in this system have to adhere different shift patterns/ time scales for each shift, therefore susceptible various physiological disorders.

Fatigue/ Sleepiness disorders:

Circadian (around a day) rhythms are physiological and behavioral functions and processes in the body that have a regular cycle of approximately a day (actually about 25 hours in man).

The different time schedule of shift may cause circadian rhythms and internal body clock desynchronization with sleep/ wake cycle and as a result could be contributory factor for fatigue/ sleepiness at work place.

Sleep is the primary human function disrupted by shift work. Many bodily processes, such as temperature, blood pressure, and heart rate, are at their lowest ebb at night; so, it is not surprising that people who try to work at night and sleep during the day often report that they cannot do either very well. Shift workers who need to sleep during the day may have difficulty in falling asleep and remaining asleep because they are attempting sleep when they are at odds with their circadian rhythms. And, because of the

conflict between work and personal demands, shift workers rarely achieve full adjustment to their shift work schedules.

Psychological/Emotional Disorders:

A common finding in shift system is that psychological and emotional distress frequently accompanies shift work although the magnitude of the effects is sometimes low. These findings are consistent with the psychological effects of shifting schedules and the resulting sleep disruption discussed previously. The psychological distress that often accompanies shift work from its onset may be the primary factor that provokes many to leave shift work.

Gastrointestinal Disorders:

Gastrointestinal disorders are the most prevalent health complaint associated with shift and night work. Irregular bowel movements and constipation, heartburn, gas, and appetite disturbances are to name the few which people have to manage beside their work.

Cardiovascular Disorders:

It is acknowledged fact that there exists relationship between shift work and cardiovascular disease. Various studies in related area reported increased risk of cardiovascular disease in shift workers specially working in groups (e.g. smoking). A mismatch between circadian rhythms and the timing of sleep, problems with family and social life, the behavior of shift workers including poor eating habits and increased tobacco and alcohol consumption are some of the ill effects of working in shift which can increase the risk of cardiovascular disease for maintenance personnel.

Other Individual Factors:

Over the age of 45 - 50 years, shift workers increasingly encounter difficulties in altering their sleep-wake cycles. Specifically, aging people experience a decrease in "deep sleep", an increase in "light sleep". Due to physiological effects of aging it becomes more difficult to cope up with the work pressure of shift for the people over the age of 50.

Management of fatigue and sleep disorders in shift work:

Some of the measures while managing the shift work should be practiced by every organization in order to:

1. Minimise the build-up of fatigue over periods of work

2. Maximise the dissipation of fatigue over periods of rest
3. Minimise sleep problems and circadian disruption

Daily Limits:

As performance of maintenance personnel exponentially varies with extended period of shift work, therefore, the time schedule of shift should be scrupulously adhered, to avoid fatigue related issues. Generally shift durations are 8 hrs, which may extend due to demand of work. However, working more than 12 hrs should be considered undesirable. Maintenance personnel should get adequate rest period between two shifts.

Breaks:

As fatigue builds up over a period of work and that this can be, at least partially ameliorated by the provision of breaks. Therefore, working longer duration without any break should as far as possible be avoided. Duration of break should be planned taking into account the logistic and other constraints.

Longer Limits:

As some of the residual fatigue may accumulate over weeks and months despite the provision of rest days, therefore limiting the work which can be undertaken over longer period of time and provision of leave in reasonable time is important.

Limits on Night Shifts:

There is good objective evidence that risk is increased at night by about 30% relative to the morning/day shift working staff. The efficiency of working staff also reduces progressively during night shift due to development of fatigue in adverse working condition. The risk becomes more prominent when night shifts are performed successively. Therefore, number of continuous night shift should not exceed more than two and same should be followed by at least two successive days rest period.

Policy for allocation of work during night shift should be framed taking into account the following:-

1. Adequate staffing to commensurate with the anticipated work load.
2. Whether the AMP is in initial or successive night shift. It is desirable that complex/critical tasks are planned earlier leaving the lighter job for the later part of the shift. Allocation of work to AMP should match with the availability of time during the shift and working overtime beyond the night shift should be avoided.

3. Whether work allocation to AMP involves single or multiple type of aircraft/engines.

Guidelines for Good Practices:

1. Employers should consider developing risk management systems to enlighten the AMP in this regard. Risk management system should be a part of the organization policy for overall Safety Management System (SMS).
2. Employer should develop educational programme to increase AMP's awareness of the problems associated with shiftwork. In particular, it is important to draw their attention to the objective trends in risk with a view to increasing their vigilance at points when risk may be high despite the fact that fatigue may not be. It is also important to provide information on how to plan for night work, and to give guidance on the health risks which seem to be associated with shift work, particularly at night. Educational program/workshop should enlighten the AMP about the ill effects of fatigue and how to recognize them for self/others.
3. AMP should report for duty after adequately rested. AMP should be counselled for sufficient uninterrupted sleep to minimize stress and to dissipate fatigue during the rest period.
4. No scheduled shift should exceed 12 hours. Wherever work allocations involved multiple aircraft/ engines in a shift due consideration should be given about the complexity/ criticality of the task and quantum of work should be decided accordingly.
5. The finish time of the night shift should not be later than 08:00.
6. A morning or day shift should not be scheduled to start before 06:00, and wherever possible should be delayed to start between 07:00 and 08:00.
7. A minimum rest period of 11 hours should be allowed between the end of shift and the beginning of the next, and this should not be compromised by overtime.
8. A maximum of four hours work before a break should be planned.
9. Scheduled work hours should not exceed 48 hours in any period of seven successive days. Total work, including overtime, should not exceed 60 hours or seven successive work days before a period of rest days. In fact it is desirable that work and rest period

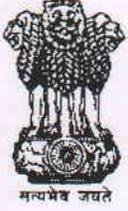
should match each other for effective dissipation of fatigue which builds up over the period of work. Work duration for any individual should also have consideration of their mental condition/stress level during the work and complexity/criticality involved.

10. Wherever possible AMP should be given at least 28 days notice for their work schedule.
11. AMP should be discouraged or prevented from working for other organizations on their rest days, and hence from exceeding the proposed recommendations on work schedules despite their implementation by their main employer.
12. Vigorous campaign shall be made for avoidance of working under the influence of Alcohol / psychoactive substances to cope up with stress / Fatigue by AMP.

AMP who are maintaining and releasing the Aircraft to service are practically ensuring the airworthiness and safety. Therefore, an AMP performing duties whilst fatigued may become potential threat and safety hazard for operation of aircraft if the issue is not properly addressed.



(E. K. Bharat Bhushan)
Director General of Civil Aviation



AAC No 2 of 2012

Date 27th December 2012

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: - Maintenance of Aircraft under CAR 145 approval and availability of certifying staff

CAR 145 A.30 (g & h) requires that any organization requiring approval for maintenance of aircraft shall have appropriate type rated certifying staff for maintenance and certification.

Therefore, it is imperative on the part of maintenance organization to ensure availability of appropriate type rated aircraft maintenance engineers in commensuration to the scope of approval applied for.

During preparedness meeting with the operator it should be ensured by DGCA Headquarters (Air Transport & Airworthiness Dtes.) that the maintenance of aircraft are entrusted to organizations who are in a position to meet the requirement of CAR 145 approval with appropriately qualified type rated certifying staff.

When an aircraft is imported into the country/organization for the first time or when maintenance organizations who do not meet the CAR 145 A 30(g & h) requirement, the case may be referred by Regional Airworthiness Office to DGCA Hdqrs for an exemption to CAR 145 A 30 (g and h). The Airworthiness Directorate (Headquarters) will process the case and seek the approval of the Director General for the exemption of CAR 145 A 30 (g) and recommend for invoking sub Rule 8 of Rule 61 of Aircraft Rule 1937 to issue authorizations as per CAR Sec-2 Series L Part IX.

Any maintenance organization approved for component maintenance activities under CAR 145 to have sufficient number of certifying staff. CAR 145 A.30 (i) requires component certifying staff to comply with Rule 61 and CAR Sec-2 Series L Part X. The approval under sub Rule 9 of Rule 61 shall be limited to components certification.

Validity of Authorization/ Approval: - Validity Authorization/ Approval shall be aligned with the renewal of organization approvals. Issue of such documents with limited validity for reasons whatsoever shall be discouraged considering the fact that payment of fees entitles an applicant for maximum validity as permissible. Issue of Authorization / Approval on a one time basis shall be avoided.

Use of certifying staff: Regional/Sub regional Airworthiness offices shall ensure that all CAR 145 approved organizations are using certifying staff in accordance with CAR 145 A. 30. (g & h) requirements and they are issued with certification authorization as per the procedure laid down in the exposition.

Sub rule 8 & 9 of Rule 61 is regarding issue of authorizations and approvals by the Director General. CAR Section 2 series L Part IX and X are describing the requirements for issue of authorizations and approvals in this regard.



(Charan Dass)

Jt. Director General of Civil Aviation
For Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC No. 2 of 2013
Dated 20th January, 2013

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Modification and Repair

1. INTRODUCTION

- 1.1 Rule 52 of Aircraft Rules, 1937 describes the requirement for approval of modification or repair affecting safety of any aircraft in respect of which there is a valid certificate of airworthiness.
- 1.2 CAR M states that "Maintenance procedure shall be established to ensure that damage is assessed and modification and repair are carried out using data approved by the DGCA or by an approved CAR 21/EASA Part 21/FAA Part 21 Design organization, as appropriate".
- 1.3 ICAO Annex 6 requires that all modification and repair on an operating aircraft shall comply with airworthiness requirements of the State (DGCA) and procedures shall be established to ensure that substantiating data supporting compliance with the airworthiness requirements are retained.
- 1.4 This circular stipulates the procedure to be adopted by the owners/operators for approval for carrying out modification and/or repair done on an aircraft, aircraft component and item of equipment of that aircraft.
- 1.5 It is important to note that this Airworthiness Advisory Circular (AAC) on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

2. DEFINITION

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.

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

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.

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

3 Procedure for approval of Modification

- 3.1 Modification covered in Airworthiness Directives, DGCA Mandatory Modification and Service Bulletin does not require DGCA approval.
- 3.2 Modification which is not covered in Airworthiness Directives, DGCA mandatory modification and service bulletin require DGCA approval.
- 3.3 For modification the owner/operator shall apply to the concerned Regional Airworthiness Office (RAO) along with evidences and data relating to the intended modification and its effect on the airworthiness of aircraft, as per details given in para- 5.
- 3.4 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.

- 3.5 The person responsible for the modification design shall state any particular requirements to 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.
- 3.6 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.
- 3.7 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.

- 3.8 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.
- 3.9 Approval of a modification will only be granted when the DGCA 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.
 - c) The drawings and other documents required for the work are of a satisfactory standard and in accordance with acceptable aeronautical practices.
- 3.10 DGCA may require compliance checks after the completion of the modification and before any aircraft component or equipment is released for service.
- 3.11 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.

4 Procedure for approval of Repair

- 4.1 Repair covered in the Structural Repair Manual (SRM), do not require DGCA approval. This repair may be carried out by Approved Maintenance Organisation as per data available in SRM.
- 4.2 Repair which are not covered in SRM require DGCA approval.
- 4.3 The owner/operator shall apply to the concerned Regional Airworthiness Office (RAO) along with evidences and data relating to the intended repair and its effect on the airworthiness of aircraft, as per details given in para- 5.
- 4.4 Owner/Operator will classify the damage as minor or major based on manufacturer's relevant document or seek assistance from the manufacturer.

- 4.5 Once a structural repair has been classified as major or minor, owner/operator shall submit the repair scheme to the manufacturer for their review or request for repair scheme by providing the details of damage. Details forwarded may include photographs, sketches, relevant pages of maintenance data specifying the area of damage etc. for obtaining the feedback from the manufacturer.
- 4.6 Repair scheme and approved data received from the manufacturer shall be forwarded to the regional Airworthiness office for obtaining approval. Copy of Repair and Deviation Record (RDR), Repair Design Approval Sheet (RDAS), as applicable shall also be attached along with the repair data along with the application for approval.
- 4.7 The repair scheme and approved data prepared by the aircraft, components/equipment manufacturer, which are duly approved by State of Design or the repair scheme certified by Authorized Representatives (AR)/ Designated Engineering representatives (DER) of the State of Design of the aircraft are acceptable for use in repair of aircraft, components/equipment.

5 Application for Approval of Modification and Repair

- 5.1 The owner/operator shall submit a duly completed application as per Form CA 2(RM), in duplicate, for carrying out modification and/or repair to the concerned Regional Airworthiness Office. The following modification or repair documents should be attached along with the application:
 - a) Detailed description of the proposed modification or repair, including initial damage detail, related correspondence with manufacturer/DOA.
 - b) A master documentation list detailing the individual drawings and specifications which define the modification or repair;
 - c) Drawings and instructions necessary for incorporation of the modification or repair;
 - d) Testing procedures or methods to meet certification and operating rules, such as flammability, carbon monoxide, and noise requirements;
 - e) Test procedures that are appropriate to the modification or repair and to verify that the modification or repair meets applicable certification requirements;
 - f) Detailed design standards, to ensure that the operator has considered all applicable design requirements and acceptance engineering reports including expected test results to be used in determining the compliance of the modified or repaired product;
 - g) A record of the change in mass and moment arm when the modification or repair is installed in the aeronautical product;

- h) A record of the change in electrical load when the modification or repair is installed in an aircraft:
- i) Supplements to:
 - (i) The approved flight manual
 - (ii) Maintenance instructions;
 - (iii) Instructions for continuing airworthiness
 - (iv) repair instructions,
- j) Any other factors that may affect safety or Airworthiness.

6 General Requirements

6.1 The Authorized Representatives/Designated Engineering Representatives responsible for certifying modification/repair approved data shall be an employee of the organization holding DOA. Certifications by independent representative shall not be acceptable.

6.2 Recommendations or No Technical Objection (NTO) from the manufacturer shall not be acceptable for grant of approval.

6.3 The following data sources are considered as Approved Sources:

The data sources defined in Para 3.4 and 4.7 are considered as approved sources.

6.4 Procedure for Approval of Modification/Repair, where design data are received from the approved sources:

When the operator/owner has submitted the data received from approved sources as per Para 6.3, the RAO may permit to carry out Modification/Repair on the basis of the repair proposal and the design data submitted by the operator/owner.

The approval may be granted on FORM CA-2(MR) to the owner/operator by RAO, after ensuring the following:

- a) Modification/Repair has been completed as per the proposal made.
- b) If there are any deviations during the practical implementation of the Modification/Repair proposal made, they are duly authenticated by the manufacturer/organisation holding DOA approval of the state of design.

- c) The modification/repair completion report has been accepted by the manufacturer.
- d) The accomplishment of repair/modification has been verified/accepted by the Regional Airworthiness Office (RAO).

6.5 Procedure for Approval of Modification/Repair, where design data are not from approved sources:

If the design data submitted by the operator did not meet the requirements mentioned in Para 6.3, then the Regional Airworthiness Office will examine the proposal and forward the same to the Airworthiness Directorate at DGCA Headquarters. The Airworthiness Directorate at DGCA Headquarters will review the case and forward the same for detailed analysis and approval of the modification/repair scheme data to the Aircraft Engineering Directorate (AED). The operator/owner may have to provide necessary data to AED in line with requirements stipulated in Part-3 of AED Hand Book of Procedures (available on DGCA website at www.dgca.gov.in). On receipt of approval from the AED, the same shall be conveyed to the Regional Airworthiness Office for grant of approval to owner/operator.

- 6.6 Owner/operator shall include the above procedure in the Maintenance Organisation Exposition (MOE), Maintenance Organisation Manual (MOM)/ Continuing Airworthiness Management Exposition (CAME), as applicable.
- 6.7 The Owner / Operator shall ensure that aircraft wise record of all modification and/or repair is maintained.



(Charan Dass)

Joint Director General of Civil Aviation

DIRECTORATE GENERAL OF CIVIL AVIATION

FORM CA-2(MR)

APPLICATION FOR APPROVAL OF MODIFICATION AND REPAIR

1. Aircraft	Make :	Model:			
	Serial No.:	Registration Mark:			
2. Owner/Operator	Name:				
	Address :				
3. Unit Identification:					
Unit	Make	Model	Serial No.	Mod/ Repair	
				Major	Minor
Airframe					
Power plant					
Propeller					
Component					
4. Description of work:					
5. Assessments and Attachments :					
6. Owner/ Operator's Signature	Name	Signature	Date		
7. DGCA APPROVAL	Comments:				
	Approved	Rejected	Remarks		
	Name:	Signature	Date		



AAC No 3/2013
Date 06-12-2013

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: **EDTO Airworthiness Approval**

1. **INTRODUCTION :- Purpose and Scope**

- 1.1 CAR Section 8 Series S Part I requires the operator to seek DGCA approval prior to operating their aircraft for EDTO Operation. This circular should be read in conjunction with the above CAR.
- 1.2 This circular details the approval process required to be followed by each operator seeking Initial and subsequent airworthiness approvals to undertake EDTO operation.
- 1.3 The Airworthiness approval requires the operator to comply with the additional continuing airworthiness requirements related to EDTO operation as detailed in this circular. Compliance Checklist to demonstrate the compliance of Airworthiness requirements for special operation approval is available in chapter 24 of Airworthiness procedure manual which is available on dgca website i.e, www.dgca.nic.in.
- 1.4 The specified airframe/engine combination, to be eligible for EDTO must have been certificated to the airworthiness standards of Transport Category aeroplanes Federal Aviation Regulation (FAR) Part 25, the European Aviation Safety Agency (EASA) CS25 or the equivalent.

2. **Application**

- 2.1 Any operator applying for EDTO approval (Airworthiness aspect) should submit a request, with the required supporting data, to the DGCA at least 3 months prior to the proposed start of EDTO with the specific airframe/engine combination.
- 2.2 Application for approval for EDTO operations shall be submitted to the Regional/ Sub-Regional offices where the aircraft is based along with para wise compliance of the CAR related to the operation. The supporting documents confirming compliance with requirements of CAR and the EDTO

Compliance Check attached with Chapter 24 B of APM (Available on dgca website i.e, www.dgca.nic.in) shall also be enclosed by the concerned operator seeking approval. The checklist should clearly show the compliance and the location of the compliance in the column 1.. Verification remarks column to be used by DGCA officer. The operator should further furnish details of the procedure/instructions and methodology for continued capability to adhere to conditions laid down at the time of grant of approval in a separate EDTO Manual their by personnel involved in EDTO. Any amendment to the EDTO manual requires DGCA approval.

3. Operator EDTO process elements

3.1 The operator seeking EDTO Airworthiness Approval should also demonstrate to the DGCA that it has established an EDTO process that includes the following EDTO elements:

- i) Airframe/engine combination and engine compliance to EDTO/ EDTO Type Design Build Standard (CMP); Evidence that the type design of the aeroplane is approved for extended range operation is normally reflected by a statement in the Aircraft Flight Manual (AFM) and Type Certificate Data Sheet (TCDS) or Supplemental Type certificate (STC),
- ii) *Engineering Modifications* - The operator must provide to DGCA all titles and numbers of all modifications, additions, and changes which were made in order to substantiate the incorporation of the CMP standard in the aeroplanes used in EDTO.
- iii) Compliance with the continuing airworthiness requirements as defined in Para, 4 which should include EDTO:
 - a. Occurrence reporting
 - b. Maintenance Programme;
 - c. Reliability Programme;
 - d. Oil Consumption Monitoring Programme;
 - e. Engine Condition Monitoring and Reporting system;
 - f. Propulsion system monitoring programme;
 - g. EDTO parts control programme;
 - h. Plan for resolution of aeroplane discrepancies.
 - i. Aircraft performance monitoring programme
- iv) The operator should establish a programme that results in a high degree of confidence that the propulsion system reliability appropriate to the EDTO diversion time would be maintained;
- v) Initial and recurrent training and qualification programmes in place for all EDTO related personnel.

3.2 Control Process (centralised control process)

3.2.1 Procedures, and a centralised control process, must be established which would preclude an aeroplane being released for EDTO after propulsion system shut down, or EDTO significant system failure on a previous flight, or significant adverse trends in system performance, without appropriate corrective action having been taken. Confirmation of such action as being appropriate may, in some cases, require the successful completion of one or more non-revenue or non-EDTO revenue flights (as appropriate) prior to being released on an EDTO. As an alternative the first 60 minutes of an EDTO flight can be used as a verification flight.

3.2.2 The operator conducting EDTO (regardless of the size of its EDTO fleet) must have a centralized entity responsible for monitoring of the EDTO maintenance activities. The certificate holder must develop and clearly define in its EDTO maintenance document specific procedures, duties, and responsibilities for involvement of their centralized maintenance control personnel in their EDTO operation.

3.3 Customised MEL and DDPG

3.3.1 Approved copy of customised MEL and DDPG shall be submitted to DGCA along the application.

4. CONTINUING AIRWORTHINESS CONSIDERATIONS

4.1 The continuing airworthiness management organisations (CAMO) managing the aircraft for which an EDTO operational approval is sought, ensure that additional requirements for maintenance and monitoring are to be complied with in addition to the applicable continuing airworthiness requirements of CAR-M. They specifically affect:

- a. Occurrence reporting;
- b. Aircraft maintenance programme and reliability programme;
- c. EDTO Manual / Continuing airworthiness management exposition;
- d. Competence of continuing airworthiness and maintenance personnel.

4.2. OCURRENCE REPORTING

In addition to the items generally required to be reported in accordance with requirements, the following items concerning EDTO should be included:

- a. in-flight shutdowns;
- b. diversion or turn-back;
- c. un-commanded power changes or surges;
- d. inability to control the engine or obtain desired power; and
- e. failures or malfunctions of EDTO significant systems having a detrimental effect to EDTO flight.

Note: status messages, transient failures, intermittent indication of failure, messages tested satisfactorily on ground not duplicating the failure should only be reported after an assessment by the operator that an unacceptable trend has occurred on the system

The report should identify as applicable the following:

- a. aircraft identification;
- b. engine, propeller or APU identification (make and serial number);
- c. total time, cycles and time since last shop visit;
- d. for systems, time since overhaul or last inspection of the defective unit;
- e. phase of flight; and
- f. corrective action.

4.3. EDTO MAINTENANCE PROGRAMME

4.3.1. The maintenance programme should contain the standards, guidance and directions necessary to support the intended operations. Maintenance personnel involved, including maintenance sub-contractors' personnel, should be made aware of the special nature of extended diversion time operation (EDTO) and have the qualifications, authorisation, knowledge, skill and ability to accomplish the requirements of the programme. The quality of maintenance and reliability programmes can have an appreciable effect on the reliability of the propulsion system and the EDTO Significant Systems. The proposed maintenance and reliability programme's ability to maintain an acceptable level of safety for the propulsion system and the EDTO Significant Systems of the particular airframe/engine combination. is assessed and approved by DGCA The maintenance programme should also include tasks to maintain the integrity of cargo compartment and pressurisation features, including baggage hold liners, door seals and drain valve condition. Processes should be implemented to monitor the effectiveness of the maintenance programme in this regard

4.3.2. Any changes to the maintenance and training procedures, practices or limitations established in the qualification for EDTO must be submitted to the DGCA for approval .

4.3.3 The maintenance programme should be reviewed and supplemented as necessary to ensure that it adequately provides for the continued airworthiness for the aircraft being considered for EDTO: .

- The operator must identify all tasks that need to be completed and certified as complete by EDTO- qualified maintenance personnel The intent is to have EDTO- trained maintenance personnel accomplish these tasks because they are related to EDTO.
- EDTO related procedures, such as maintenance of EDTO significant

system items should be clearly defined in the system of maintenance.

- Logbooks should be reviewed and documented, as appropriate, to ensure proper Minimum Equipment List (MEL) procedures, deferred items and maintenance checks, and that system verification procedures have been properly performed.

4.3.4. Scheduled Maintenance of Multiple Identical Systems (Dual Maintenance)

The operator must establish procedures that minimize scheduling dual maintenance actions to multiple similar elements in any EDTO significant system during the same routine or non-routine maintenance visit. In order to manage this requirement, the certificate holder must develop a list of fleet-specific EDTO significant systems and include them in their EDTO Manual. The certificate holder should include a clear definition of what constitutes dual maintenance in their EDTO maintenance document. In the event that the certificate holder performs dual maintenance, their procedures must ensure the verification of positive corrective action prior to entry into EDTO airspace. The procedures must ensure that such maintenance actions are performed by a different qualified technician, or if performed by the same technician, then he or she must be under the direct supervision of a second qualified individual. In either case, a qualified individual must conduct a ground verification test and ensure that any in-flight test that is required by the certificate holder be done as well. An operator may choose to conduct a functional check flight after a heavy maintenance visit to address dual maintenance actions in addition to first performing ground verification action. While planning schedule maintenance following shall be kept in mind:-

- The operator should identify specific maintenance activities that are to be carried out to multiple identical systems on a planned basis.
- If the maintenance activities identified above are carried out, a subsequent EDTO verification flight is not required if the operator has identified the activity and has a procedure in place which provides an equivalent level of safety.
- Where the disturbance to multiple identical systems is unavoidable during a scheduled check, the maintenance personnel carrying out the maintenance task must not repeat that task on an identical system, on the same aeroplane during that check.
- If a disturbance occurs which is otherwise unavoidable during a scheduled check, separate maintenance personnel must carry out the respective system's maintenance tasks with an independent physical check completed and signed for by an authorised person.
- Any maintenance task which disturbs multiple identical elements of EDTO significant systems should be identified as such on the operator's work forms and instructions.
- Upon completion of maintenance, complete and adequate testing

should be carried out in accordance with the aeroplane maintenance manual/s and modification instructions.

- An EDTO verification flight should be carried out where ground testing cannot provide positive assurance of serviceability.
- After the disturbance of a component which, if it was to leak, could cause loss of system fluid (oil, fuel, hydraulic or air) a high power engine ground run is required to check system integrity.

4.3.5 PRE-DEPARTURE SERVICE CHECK

4.3.5.1 An EDTO service check should be developed to verify that the status of the aeroplane and certain critical items are acceptable. This check should be accomplished and signed off by an authorised and qualified person prior to an EDTO flight. A member of the flight crew may also perform these checks, if appropriately trained and authorised.

4.3.6 Unscheduled maintenance

- When unscheduled maintenance is carried out which disturbs identical elements of EDTO significant systems the system should be tested after rectification in accordance with the aeroplane maintenance manual procedures to provide positive assurance of serviceability.
- An EDTO verification flight should be carried out where ground testing cannot provide positive assurance of serviceability.
- Maintenance action must be taken to isolate faults that are intermittent in nature and if the fault cannot be positively corrected an EDTO verification flight should be carried out.

4.4 Reliability Programme :

4.4.1 An EDTO reliability programme should be developed or the existing reliability programme supplemented. This programme must be designed to achieve early identification and prevention of EDTO related problems as the primary goal. The programme should be event-orientated and incorporate reporting procedures for significant events detrimental to EDTO flights. This information should be readily available for use by the operator and DGCA to help establish that the reliability level is adequate, and to assess the operator's competence and capability to safely continue EDTO. DGCA must be notified within 72 hours of events reportable through this programme.

In addition to the items required to be reported by regulation, the following items must-be included:

- In-flight shutdowns;
 - Diversion or turnback;
 - Uncommented power changes or surges; and
 - Inability to control the engine or obtain desired power; and problems with EDTO significant systems.
- Any other event detrimental to EDTO

The report must identify the following:

- Aeroplane identification;
- Engine identification (make and serial number);
- Total time, cycles and time since last maintenance inspection;
- For systems, time since overhaul or last inspection of the defective unit;
- Phase of flight; and
- Corrective action

4.5 ASSESSMENT OF PROPULSION SYSTEMS RELIABILITY

4.5.1 The operator's assessment of propulsion systems reliability for the EDTO fleet should be made available to the DGCA (with the supporting data) on at least a monthly basis, to ensure that the approved maintenance programme continues to maintain a level of reliability necessary for EDTO operations.

4.5.2 The assessment should include, as a minimum, engine hours flown in the period, in-flight shutdown rate for all causes and engine removal rate, both on a 12-months moving average basis. Where the combined EDTO fleet is part of a larger fleet of the same aircraft/engine combination, data from the total fleet will be acceptable.

4.5.3 Any adverse sustained trend to propulsion systems would require an immediate evaluation to be accomplished by the operator in consultation with the DGCA. The evaluation may result in corrective action or operational restrictions being applied.

4.5.4. A high engine in-flight shutdown rate for a small fleet may be due to the limited number of engine operating hours and may not be indicative for an unacceptable trend. The underlying causes for such an increase in the rate will have to be reviewed on a case-by-case basis in order to identify the root cause of events so that the appropriate corrective action is implemented.

4.5.6 If an operator has an unacceptable engine in-flight shutdown rate caused by maintenance or operational practices, then the appropriated corrective actions should be taken.

4.6 OIL CONSUMPTION PROGRAMME

4.6.1. The operator should implement an EDTO oil consumption monitoring programme. The operator's oil consumption programme should reflect the manufacturer's recommendations. The programme should contain procedures to monitor and respond to oil consumption trends. It should consider the

amount of oil added at each departing station with reference to the running average consumption, i.e. the monitoring must be continuous up to, and including, oil added at each departure station. If oil analysis is recommended to the type of engine installed, it should be included in the programme. If the auxiliary power unit (APU) is required for EDTO operation, it should be added to the oil consumption programme.

4.7 APU IN-FLIGHT START PROGRAMME

- 4.7.1 Where an APU is required for EDTO and the aircraft is not operated with this APU running prior to the EDTO entry point, the operator should initially implement a cold soak in-flight starting programme to verify that start reliability at cruise altitude is above 95%. Once the APU in-flight start reliability is proven, the APU in-flight start monitoring programme may be alleviated. The APU in-flight start monitoring programme should be acceptable to the competent authority.
- 4.7.2 The Maintenance procedures should include the verification of in-flight start reliability following maintenance of the APU and APU components, as defined by the OEM, where start reliability at altitude may have been affected.

4.8. ENGINE CONDITION MONITORING PROGRAMME

- 4.8.1 The engine condition monitoring programme should ensure that a one-engine-inoperative diversion may be conducted without exceeding approved engine limits (e.g. rotor speeds, exhaust gas temperature) at all approved power levels and expected environmental conditions. Engine limits established in the monitoring programme should account for the effects of additional engine loading demands (e.g. anti-icing, electrical, etc.), which may be required during the one-engine-inoperative flight phase associated with the diversion.
- 4.8.2 The engine condition monitoring programme should describe the parameters to be monitored, method of data collection and corrective action process. The programme should reflect manufacturer's instructions and industry practice. This monitoring will be used to detect deterioration at an early stage to allow for corrective action before safe operation of the aircraft is affected.

4.9 Aircraft Performance Monitoring:

- 4.9. The continued airworthiness Program mentioned should cover Aircraft Performance Monitoring to assess any degradation in the aircraft performance. This monitoring programme should form part of EDTO manual

4.10. VERIFICATION PROGRAMME

- 4.10.1 The operator should develop a verification programme to ensure that the corrective action required to be accomplished following an engine shutdown, any EDTO significant system failure or adverse trends or any event which

require a verification flight or other verification action are established. A clear description of who must initiate verification actions and the section or group responsible for the determination of what action is necessary should be identified in this verification programme. EDTO significant systems or conditions requiring verification actions should be described in the EDTO Manual / Continuing Airworthiness Management Exposition (CAME). The CAMO may request the support of (S)TC holder to identify when these actions are necessary. Nevertheless the CAMO may propose alternative operational procedures to ensure system integrity. This may be based on system monitoring in the period of flight prior to entering an EDTO area.

4.10.2 The operator must have ground and in-flight verification flight procedures described in their supplemental maintenance program for events involving propulsion system shutdown, engine or major engine module change, primary system failure, and for certain adverse trends or prescribed events.

- Written procedures exist to ensure that the flight crew receives a full briefing prior to dispatch concerning the event and/or the maintenance performed.
- Appropriate maintenance personnel should convey to the flight crew the specific observations and/or actions required of them during the verification portion of the flight, as well as the method used to properly record the satisfactory completion of that verification flight.
- All flight crew observations and/or actions must be complete prior to entering the EDTO portion of the flight.
- Documentation of pass/fail. Communications with the dispatch or flight following center and maintenance control, and an appropriate logbook entry must be completed in accordance with the certificate holder's EDTO maintenance document.

4.11 EDTO PARTS CONTROL

4.11.1 The operator must develop a parts control programme with support from the manufacturer, that ensures the proper parts and configuration are maintained for EDTO. The programme includes verification that parts placed on an EDTO aeroplane during parts borrowing or pooling arrangements, as well as those parts used after repair or overhaul, maintain the necessary EDTO configuration for that aeroplane.

4.12 EDTO MANUAL

4.12.1. The operator should develop a manual for use by personnel involved in EDTO. All EDTO maintenance requirements and procedures should be identified in this manual as well as the specific duties, number and identity of qualified and authorised personnel, responsibilities, processes and procedures assigned to the various Maintenance & Engineering departments. Samples of the forms and reports should be included.

4.12.2 The EDTO Manual can be a chapter in the operator's existing Continuing

Airworthiness Management Exposition or it can be produced as a separate document. In either case, the EDTO Manual should provide complete details on each topic or can reference other documentation where the information is located. For example, the EDTO Pre-departure Service Check (PDSC) can be listed in the EDTO Manual or the EDTO Manual can reference the operator's PDSC task card or other manual where the check is defined. The format of the EDTO Manual, as well as identification number should be consistent with the operator's documentation system. Document handling should be in accordance with the operator's current policies relative to revision and distribution.

4.12.3 Contents of Manual

The CAMO should specify the procedures necessary to ensure the continuing airworthiness of the aircraft particularly related to EDTO operations. It should address the following subjects as applicable:

- a. General description of EDTO procedures
- b. EDTO maintenance programme development and amendment
- c. EDTO reliability programme procedures
 - (1) Engine/APU oil consumption monitoring
 - (2) Engine/APU Oil analysis
 - (3) Engine conditioning monitoring
 - (4) APU in-flight start programme
 - (5) Verification programme after maintenance
 - (6) Failures, malfunctions and defect reporting
 - (7) Propulsion System Monitoring/Reporting
 - (8) Aircraft Performance Monitoring
 - (8) EDTO significant systems reliability
- d. Parts and configuration control programme
- e. Maintenance procedures that include procedures to preclude identical errors being applied to multiple similar elements in any EDTO significant system
- f. Interface procedures with the EDTO maintenance contractor, including the operator EDTO procedures that involve the maintenance organisation and the specific requirements of the contract
- g. Procedures to establish and control the competence of the personnel involved in the continuing airworthiness and maintenance of the EDTO fleet.

4.12.4 Training Programme

Proposed Training Programme for personnel involved in the Continuing Airworthiness and Maintenance of the EDTO Fleet should contain initial and recurrent training for as follows:

1. INTRODUCTION TO EDTO REGULATIONS AND CIRCULARS
 - a. Contents of CAR

- b. EDTO Type Design Approval – a brief synopsis
- 2. EDTO OPERATIONS APPROVAL
 - a. Maximum approved diversion times and time-limited systems capability
 - b. Operator’s Approved Diversion Time
 - c. EDTO Area and Routes
 - d. EDTO MEL
- 3. EDTO CONTINUING AIRWORTHINESS CONSIDERATIONS
 - a. EDTO significant systems
 - b. CMP and EDTO aircraft maintenance programme
 - c. EDTO pre-departure service check
 - d. EDTO reliability programme procedures
 - e. Engine/ APU oil consumption monitoring
 - f. Engine/APU Oil analysis
 - g. Engine conditioning monitoring
 - h. APU in-flight start programme
 - j. Verification programme after maintenance
 - k. Failures, malfunctions and defect reporting
 - l. Propulsion System Monitoring/Reporting
 - m. EDTO significant systems reliability
 - n. Parts and configuration control programme
 - o. CAMO additional procedures for EDTO
 - p. Interface procedures between CAR 145 organisation and CAMO

4.12.5 COMPETENCE OF CONTINUING AIRWORTHINESS AND MAINTENANCE PERSONNEL

- 4.12.5.1 The CAMO organisation should ensure that the personnel involved in the continuing airworthiness management of the aircraft have knowledge of the EDTO procedures of the operator.
- 4.12.5.2 The CAMO should ensure that maintenance personnel that are involved in EDTO maintenance tasks:
 - a) Have completed an EDTO training programme reflecting the relevant EDTO procedures of the operator, and,
 - b) Have satisfactorily performed EDTO tasks under supervision, within the framework of the CAR-145 approved procedures for Personnel Authorisation.

5 Approval for EDTO

- 5.1 After satisfactory demonstration with the CAR requirements, Contents of EDTO Manual, Aircraft eligibility etc. the request of operator along with approved manual and a copy of completed checklist shall be forwarded by the Regional office to the DGCA, Hqrs (Airworthiness Directorate) for further action. Initial Operations Approval for EDTO shall be issued by the

DGCA Hqrs. indicating Airframe engine combination and tail no of aircraft, after satisfactory scrutiny both by Airworthiness offices. Approval for additional aircraft shall be granted by regional office. Procedure to be followed by Airworthiness Office for processing the request of operator is described in chapter 24 B of Airworthiness procedure manual.

6. CONTINUING SURVEILLANCE

- 6.1 The fleet-average IFSD rate for the specified airframe/engine combination shall be monitored by the operator. The DGCA should also monitor all aspects of the EDTO that it has authorised to ensure that the levels of reliability achieved in EDTO remain at the satisfactory levels. and that the operation continues to be conducted safely. In the event that an acceptable level of reliability is not maintained, if significant adverse trends exist, or if significant deficiencies are detected in the type design or the conduct of the EDTO operation, then the appropriate Competent Authority should initiate a special evaluation, impose operational restrictions if necessary, and stipulate corrective action for the operator to adopt in order to resolve the problems in a timely manner. The Regional office should alert the DGCA Hqrs when a special evaluation is initiated and make provisions for their participation.
- 6.2 **Daily Monitoring.** In addition to the normally internal audit and surveillance each operator is required to have daily monitoring of their EDTO program in place as part of the daily oversight. Daily fleet performance, event reports, adverse trends, and pilot reports shall be monitored and in case of event/occurrences, the same shall be reported to DGCA.

Sd/-
(Charan Dass)
Jt Director General of Civil Aviation
For Director General of Civil Aviation



AAC No 4 of 2013
Date 13th December 2013

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Engine oil loss due to damage of 'O' ring of oil cap.

It has come to the notice of Headquarters that there was an engine inflight shutdown incident which had occurred due to loss of engine oil and thereby engine low oil pressure warning. Further it was revealed that oil loss had occurred due to the damage of 'O' ring of oil cap.

Replenishment of oil as a part of engine oil servicing is being undertaken by the maintenance personnel during maintenance. To facilitate oil servicing maintenance personnel are required to open and close the oil cap. Therefore it is imperative that such exercise should be carried out with utmost care. In addition to the above it is also required for all certifying staff to supervise such task completion by support staff in vigilant manner.

Before issue of certificate of release to service certifying staff should ensure that all necessary task required for oil servicing have been carried out in diligent manner leaving no room for loss of oil. Scrupulous adherence of above action may avoid some engine shutdown related incidents.


(Charan Dass)
Jt. Director General of Civil Aviation
For Director General of Civil Aviation



AAC No 5 of 2013
Date 13th December 2013

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Validity of certification authorization and AME license.

CAR 145.A.30 (g) and (h) requires that maintenance of aircraft should be done by appropriate type rated certified staff qualified in accordance with DGCA license requirement and issued with certification authorization by the organization as per CAR 145.A.35. However, such authorization should comply with the DGCA licensing requirement; therefore it is imperative that validity of certification, authorization should also comply with the AME license validity.

In the recent past it has come to the notice of Headquarter that in some of the organization the validity of certification authorization was not compliant with AME license. As a result the certifying personnel who was following authorization validity for certification work was unaware about the expiry of AME license in between. Further there was no system available in the organization to detect such lapses.

In view of the above it is required that all the CAR 145 maintenance organization should develop a system to monitor the certification authorization validity in line with AME license validity. It is also the responsibility of certifying personnel to take all necessary action to ensure that both the above documents always remain compliant with each other.

(Charan Dass)
Jt. Director General of Civil Aviation
For Director General of Civil Aviation



AAC No. 1 of 2015
Dated 28th July 2015

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Coding and Registration of ELTs

1. Introduction

- 1.1 CAR Section 8 Series O details the requirements for Installation of Emergency Locator Transmitter (ELT) on all aircraft. Further, Para 5 of CAR Section 9 Series D Pt IV (Section-II) details the requirements for operation, specifications and registration of ELT with INMCC (ISRO). Para 5.10 of this CAR also defines the responsibility of owner /operator to register the ELT with INMCC. Indian Mission Control Centre (INMCC) is responsible for maintaining 406 MHz ELT register in India and provides ELT register information for search and rescue operations
- 1.2 Contracting States are required to establish, maintain and operate search and rescue services within their territories to ensure that assistance is rendered promptly to persons in distress whether individually or in cooperation with other States.
- 1.3 The COSPAS - SARSAT (Cosmicheskaya Sistema Poiska Avariynyh Sudov which translates to "Space System for the Search of Vessels in Distress' – 'Search And Rescue Satellite-Aided Tracking'), a satellite-based international distress alert detection and information distribution system, established by ISRO at Bangalore to detect and locate emergency beacons (ELTs) activated by aircraft in distress.
- 1.4 Experience and statistics show that many times the particulars of the aircraft, operator and contact personnel details are either not available or not correctly provided in the INMCC registration database. In some cases, Emergency Locator Transmitter (ELT) or not programmed/coded as required depriving the timely assistance to those in distress. Operators acquiring/leasing aircraft from outside India are found to have unintentional error in coding the ELTs with a country other than India (419).
- 1.5 Activating a 406 MHz beacon for even a very short time will generate a COSPAS-SARSAT distress alert message that will be relayed to the respective Rescue Coordination Centres (RCCs) through Indian Mission Control Centre (INMCC) for the immediate action. As such it is most important to ensure that false distress signals are not emitted by the ELT units held by any organisation triggering chain of infructuous action consuming invaluable time and resources.
- 1.6 It is therefore essential to
 - i) programme the individual ELT to transmit correct particulars of the nationality, aircraft and operator;
 - ii) registered with the INMCC through online web-portal;

- iii) maintain the registration data updated specially emergency contact details; and
- iv) restrain from emitting false distress alerts.

1.7 ELT register information shall include, at least the following:

- a) transmitter identification (expressed in the form of an alphanumerical code of 15 hexadecimal characters);
- b) transmitter manufacturer, model and, when available, manufacturer's serial number;
- c) COSPAS-SARSAT type approval number;
- d) name, address (postal and e-mail) and emergency telephone number of the owner and operator;
- e) name, address (postal and e-mail) and telephone number of other emergency contacts (two, if possible) to whom the owner or the operator is known;
- f) aircraft manufacturer and type; and g) colour of the aircraft; and
- h) aircraft nationality and registration marks.

1.8 In order to effectively utilize the COSPAS - SARSAT system for identifying aircraft in distress and relaying the information to the rescue authorities/personnel concerned without loss of time, it is vital to ensure that all the 'Emergency Locator Transmitters - capable of emitting 406 MHz signals' used in the Indian Civil Aviation Sector are correctly programmed and registered with the "Indian Mission Control Centre (INMCC)"

1.9 This circular stipulates the procedure to be adopted by the owners/operators relating to programming the ELT, registering with the Indian Mission Control Centre and maintaining records thereof.

2. Applicability

- a) All Indian registered aircraft operators.
- b) All approved organisation holding one or more ELTs in their stores.

2.1 Programming (coding) ELT

2.2 The programming (coding) of ELT shall be performed by the OEM or any organisation authorised by the OEM or a person trained to programme the ELT.

2.3 If the programming (coding) is performed by a trained individual the details shall be verified and certified by an Aircraft Maintenance Engineer in the Aircraft Radio Logbook or equipment History Card.

2.4 Prior to transfer of an ELT to any other organisation or exporting the aircraft or change of ownership / operator of the aircraft, the programming (coding) should be updated and certified in the equipment history card or aircraft radio logbook as the case may be, and must be deregistered from the INMCC database.

3. Fitment of ELT on Aircraft

3.1 Records of ELT programming (coding) shall be verified for the correctness with respect to the data downloaded from the equipment by the AME concerned and certified

3.2 Upon fitment of an ELT the AME concerned shall update the ELT registration data

4. Registration of ELT

4.1 Irrespective of whether an ELT is fitted on to an aircraft or not shall be registered with Indian Mission Control Centre (INMCC) through online registration portal (<https://inmcc.istrac.org/>). Spare ELTs should also be registered with, which could be traceable.

4.2 The information registered with the INMCC shall be maintained upto date by the organisation or operator concerned at all time.

Note: Operators operating foreign registered aircraft under wet lease shall ensure that ELT installed on the aircraft are coded according to state of registry and registered with respective monitoring agency. Confirmation to that effect shall be submitted to DGCA prior to start of wet lease operation.

5. Deregistration of ELT

5.1 After transfer of an ELT to other organisation or change of ownership / operator of the aircraft, the registration data should be updated or deregistered if required and records maintained by the organisation.

5.2 The new operator should re-programme/code the ELT as per operator's nationality, aircraft registration number and reregister with MCC concerned if used outside India.

6. Records

6.1 Consolidated records and details of registration in respect of each ELT either fitted on to an aircraft or held in the stores shall be maintained by the manager responsible for Maintenance of the Aircraft or the Continuing Airworthiness of the Aircraft as the case may be.

6.2 The above records shall be presented to the authorised officials of DGCA for inspection.

7. Testing of ELT

7.1 The ELT shall be subjected for test in 'Self-Test Mode' only.

8. Emission of Actual Signals

8.1 No person shall cause emission of 406 MHz signals unless in distress or obtained a specific advance permission from INMCC and/or respective RCC.

9. Inadvertent Signal Transmission

- 9.1 All instances of inadvertent emission of signals shall immediately be reported to the respective RCC/MRCC with a copy to INMCC. The status shall be updated online through the registered user account under which the ELT is registered.
- 9.2 All approved organisations and aircraft operators shall investigate instances of false transmission of 406 MHz beacons when reported by INMCC or RCC and take necessary preventive action.
- 9.3 Action taken against each false transmission of signals shall be provided to the INMCC, respective RCC (Appendix II) and DGCA regional office.

Sd/-
(K P Srivastava)
Deputy Director General of Civil Aviation
For Director General of Civil Aviation

Address:

Indian Mission Control Centre (INMCC)
ISRO Telemetry Tracking and Command Network (ISTRAC)
Indian Space Research Organization (ISRO)
Govt. of India/Dept. of Space
Plot no. 12, Peenya Industrial Estate
Bangalore-560058
For operations related matters:
Indian Mission Control Centre (INMCC), Bangalore

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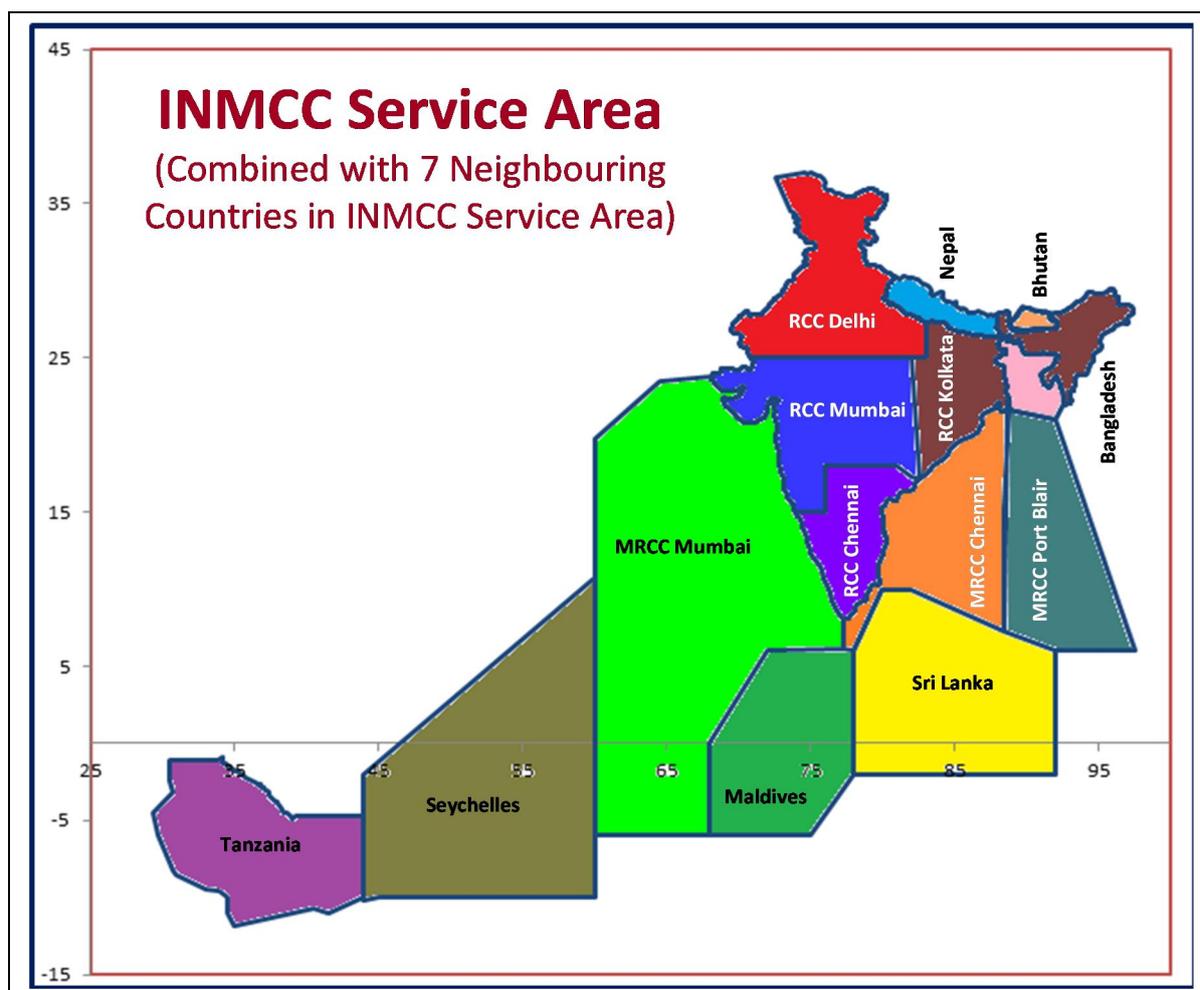
e-mail inmcc@istrac.org

INMCC Website <https://inmcc.istrac.org/>

INDIAN SERVICE AREA:

The Indian Mission Control Centre (**INMCC**), responsible for providing distress alerting services to National Aeronautical and Maritime Rescue Coordination Centres (**ARCCs and MRCCs**), Search and Rescue Points of Contact (**SPOC**) in seven neighbouring countries and other international Mission Control Centres (**MCCs**), is co-located with the Bangalore LUT.

Following diagram represents the INMCC service area covering 7 national Search and Rescue zones supported by ARCCs and MRCCs, and 7 SPOCs.



Indian Ground Systems: Bangalore (LEOLUT, GEOLUT, INMCC), Lucknow LEOLUT
Indian Space Systems: INSAT-3A and INSAT-3D

National RCCs: 4 Aeronautical RCCs supported by Airports Authorities of India situated at metro airports (Chennai, Mumbai, Delhi and Kolkata)

National MRCCs: 3 Maritime RCCs supported by Indian Coast Guard situated at Mumbai, Chennai, and Port Blair

INMCC SPOCs (7 Neighbouring Countries): Nepal, Bhutan, Bangladesh, Sri Lanka, Maldives, Seychelles, Tanzania



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC No. 1 of 2016
Dated- 2nd March 2016

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Check List of Current Airworthiness Advisory Circulars

The following is the list of current Airworthiness advisory Circulars (AAC) year wise, issued for information and necessary action

List of Current AAC (Updated up to 31-12-2015)

Year of Issue	Subject
1998	AAC 6 of 1998 - Grant of approval to Foreign Flight Engineer's Licence
	AAC 7 of 1998 - Guidelines for procuring parts manufactured by parts manufacturing approval holders (PMA)
2000	AAC 3 of 2000 - Good Maintenance Practice
	AAC 6 of 2000 - Handling of Electrostatic devices.
	AAC 8 of 2000 - Refresher training for AME licence/ Approval & Certificate of Competency holders.
2001	AAC 3 of 2001 - Banner Towing Operations
	AAC 5 of 2001 - Engineering Statistics Report
2003	AAC 4 of 2003 - Return to Service of Aircraft Items - Recovered from aircraft involved in Accidents/ Incidents.
2004	AAC 2 of 2004 - Routine Readout and maintenance of FDR/DFDR units installed on Aircraft
	AAC 3 of 2004 - Routine readout and maintenance of CVR Units installed on aircraft
2006	AAC 3 of 2006 - Authenticity and Serviceability of Aircraft Parts
	AAC 4 of 2006 - Airworthiness Approvals for Exports
2007	AAC 2 of 2007 - Certification of transit inspection of an aircraft by other organisations
2011	AAC 2 of 2011 - Categorization of Surveillance/ Audit findings
2012	AAC 1 of 2012 - Duty Time Limitation – Aircraft Maintenance Personnel (AMP)
	AAC 2 of 2012 - Maintenance of aircraft under CAR 145 approval and availability of certifying staff
	AAC 2 of 2013 Revision 1 - Modifications and Repairs
	AAC 3 of 2013 - EDTO Airworthiness Approval

Year of Issue	Subject
2013	AAC 4 of 2013 - Engine oil loss due to damage of 'O' ring of oil cap.
	AAC 5 of 2013 - Validity of Certification Authorisation and AME license
2015	AAC 1 of 2015 - Coding and Registration of ELTs
	AAC 2 of 2015 - Import/Export of Aircraft Spares, Items of Equipment etc. for use on aircraft.

Sd/-
(K P Srivastava)
Dy. Director General of Civil Aviation
For Director General of Civil Aviation



AAC No. 2 of 2016
Dated 1st April 2016

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AIRWORTHINESS ADVISORY CIRCULAR

Subject: Import/Export of Aircraft Spares, Items of Equipment etc. for use on aircraft.

1. Introduction :

1.1 Aircraft Act 1934 Para 5, inter alia, empowers the Central Government to make rules regulating the export/import of an aircraft for securing the safety of operation. *Chapter-88 of ITC (HS), 2012 SCHEDULE 1 . IMPORT POLICY* of DGFT specifies guidelines for import of aircraft and spares. Procedures to be followed for import of Aircraft is described in CAR Section 3 Series C Part XI. Airworthiness requirements for aircraft parts intended to be used on civil aircraft are specified in CAR M and CAR 145.

1.2 This circular specifies the manner in which aircraft spares, items of equipment may be imported and also exported and re-imported into India by the owner / operator of aircraft.

2. Import of Aircraft Spares:

2.1 The policy for import of aircraft spares is laid down in the Export and Import Policy and the Hand Book of Procedures issued by DGFT, Ministry of Commerce and Industry. The issue related to import of spares by various types of organisation are also detailed in relevant custom notification.

2.2 The organisations importing aircraft spares are required to comply with the provisions of the CAR M and CAR 145. The spares so imported are required to be accompanied by Authorised Release Certificate. The DGCA approved Post Holders in CAR 145 approved organisations are required to ensure that the imported aircraft items part number matches with the illustrated Part Catalog (IPC) of the aircraft/ engine/ propeller/ equipment/ component published by the manufacturer. The routine certification required by the Ministry of Finance Notification No. 12/2016-Customs dated 1st March 2016 shall be made by the DGCA approved Quality Manager in the CAR 145 approved organisation . The organisation shall also maintain records of the imported parts and their uses

and shall present the same to the authorised officials of the DGCA/ Custom. In case custom authorities require any clarification / authentication of parts by DGCA, the aircraft operator /approved organisation may approach regional / sub-regional office for necessary support.

3. Export of spares or the item/equipment for maintenance/ repair/ overhaul and re-import thereafter.

In certain cases an operator / organisation may not be able to service/ maintain/ overhaul an item of equipment removed from an aircraft within the country due to various reasons. In such cases the organisations exporting the items for repairs/overhaul at approved firm/agency abroad may do so after ensuring the approval status of the organisation. In case of premature failure of components, the aircraft operator shall make necessary arrangements with the overhaul agencies and arrange copy of the investigation report where required. Some of the manufacturers abroad have a procedure called Standard Exchange Programme wherein a failed part is replaced by a serviceable part of another serial number. In such cases the operator may export the failed part/life expired part and replacement thereof by serviceable part of different serial number. In such cases also the aircraft operator are required to ensure that investigation reports of the prematurely removed components are received on completion of the investigation within a period specified by them. The export and re-import of spares are subject to compliance of Reserve Bank of India or any other regulation, if any, on the subject

4. Import of Tools/Equipment

Import of tools/equipment specified by the manufacturer of aircraft/accessory for maintenance/testing etc., the importer should follow the applicable DGFT / Custom guidelines. With regard to the certification, and maintenance of records relating to the tools and equipment imported by the organisation procedures as stated in the Para 2 for import of aircraft spares should be followed.

This Supersedes AAC No 2 /2015 issued on the subject

-Sd-

(K P Srivastava)

Dy. Director General of Civil Aviation
For Director General of Civil Aviation



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

AAC No. 3 of 2016
Dated 11th April 2016

AIRWORTHINESS ADVISORY CIRCULAR

File NO.11-690/CAR 147/AI (2)

Subject: Direct Approval of Aircraft Maintenance Type Training

1. Introduction

- 1.1 CAR 66 specifies that the Aircraft type training shall consist of theoretical training and examination which shall be conducted by a maintenance training organisation appropriately approved in accordance with CAR 147 or, when conducted by other organisations, as directly approved by the DGCA. The CAR further specifies the practical training and assessment shall also be conducted by a maintenance training organisation appropriately approved in accordance with CAR 147 or, when conducted by other organisations, as directly approved by the DGCA.
- 1.2 This circular specifies the procedure to be followed by organisations for obtaining direct approval to conduct aircraft type training including practical training.

Note: The direct approval so issued under the provisions of this circular would be a one-time approval on a case-by-case basis for a single course or predefined group of courses.

2. Application

- 2.1 The organisation seeking 'direct approval' shall apply to the concerned regional/ sub-regional office of DGCA where the training is to be conducted or if the training is to be conducted outside India to the regional office responsible for the activities of organisation whose persons are proposed for undergoing the said training.
- 2.2 The application for approval for conducting aircraft type training including practical type training shall be accompanied with following documents:

- a) Application on Form -12 (CAR-147, Appendix-IV).
- b) Regulatory authority approval (if held) along with MTOE.
- c) In case, the organization providing the theoretical type training is not approved / or if the training is to be conducted off-site, a detailed procedures describing how the type training shall be delivered.
- d) The i) course content, ii) the duration of the theoretical and/or practical elements iii) a document to substantiate and demonstrate that course content meets the requirements of Appendix III to CAR-66 and iv) the Training Need Analysis (TNA);
- e) The teaching methods and instructional equipment;
- f) The material and documentation provided to the student;
- g) The qualification and credentials of instructors, examiners and/or assessors, as applicable;
- h) The examination and/or assessment procedure, as applicable. Further guidance about the assessment and the designated assessors with regard to Appendix III to AMC to CAR-66;
- i) CAR 145 approval with inclusion of relevant aircraft type for conducting the practical elements of training along with evidence of availability of the specific aircraft type for the proposed training dates.
- j) Working arrangements, if any, made with organization appropriately approved in accordance with CAR 145 with date wise details of aircraft availability, location, practical training instructor, tasks to be performed, assigned man-hour, time, work order issued by CAMO with respect to all practical tasks to be performed in accordance with Appendix-III of CAR 66 and re-certification of aircraft.
- k) Fee as per Rule.
- l) The documentation and records to be provided to the student to justify the satisfactory completion of the training course and related examination / assessment. This should include not only a certificate of completion but enough documentation and records to justify that the content and duration approved has been met and that the examination / assessment has been successfully passed
 Note: Notwithstanding to the above small organisations / Non-scheduled operators, internal audit report of the training establishment may be provided
- m) Designated training coordinator
- n) Commitment from the organization that the access to training facilities is extended to DGCA for audit.

3. Grant of Approval

- a) Upon receipt of the application along with above document and requisite fee, the nominated official not below the level of DDAW at Regional office shall review the documents to ensure that the proposed course meets the course curriculum and standard as per Appendix III of CAR 66.
- b) Discrepancies, if any, noted should be recorded and communicated to the organisation in writing.
- c) Organisations found to have necessary infrastructure and meeting the training standard should be granted approval for a limited period to complete the training programme by the regional office. It should be ensured that the practical training is completed within three months of completion of theoretical training.
- d) The approved training organisation shall forward a copy of result and assessment report in respect of each trainee to the DGCA.
- e) The records of training shall be retained for a period specified in the training manual and be made available to DGCA as and when required.

4. Monitoring

- a) The performance of the approved course conducted by the maintenance organisation / operator in India shall be monitored by the local airworthiness office. The examination and assessment shall be conducted with the association of local airworthiness office.
- b) The above criteria apply to a full course as well as to a partial course such as the practical element of a type training course and its assessment.

Sd/-
(K P Srivastava)
Dy. Director General of Civil Aviation
For Director General of Civil Aviation

