

**CAD 360**

**AIR OPERATOR'S CERTIFICATES**

Part Two Arrangements for Maintenance Support

Information on Requirements to be met by Applicants and Holders



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## **CHAPTER 1 - FOREWORD AND ADMINISTRATION**

### **1 PURPOSE**

The purpose of Part Two of this Document is to set out the maintenance support requirements to be met by Operators for the grant and continuation of an Air Operator's Certificate (AOC) or any subsequent variation to a Certificate. It should be read in conjunction with Part One of this Document and with the relevant parts of the Air Navigation (Hong Kong) Order (AN(HK)O), and Hong Kong Aviation Requirements (HKAR).

### **2 APPLICABILITY**

- 2.1 Operator certification and the associated requirements apply to a very wide range of activities, from short air taxi and pleasure flights to world-wide airline operators. In the statutory provisions few distinctions are drawn between small scale operations with light aircraft and major airline undertakings, for the basic principles of sound operating practice are essentially similar at all levels. But in the application of these principles, and of certification requirements, it is possible and it is necessary to take account of the scale and scope of the flying activity and of operators' particular circumstances. Operators may rest assured that the Director and his inspecting staff are fully conscious of this and in dealing with certification matters will endeavour always to adopt as flexible an approach as is consistent with the maintenance of adequate standards. Small scale operators of light aircraft, balloons and airships should bear this particularly in mind in reading this publication.

NOTE: For the purpose of this Part, the term Operator is used to describe both applicants and certificate holders.

- 2.2 In this Part, the word 'must' is used to indicate where the Director expects the Operator to respond and adhere closely to the defined requirement. The word 'should' is used to indicate that the operator has a degree of latitude, particularly where the nature of the operation affects the degree of compliance, but may not ignore the requirement. If the Operator's response is deemed to be inadequate by the Director, a specific requirement may be applied.

### **3 COMPLIANCE WITH STATUTORY REQUIREMENTS**

- 3.1 The issue of a Certificate signifies only that the holder is considered competent to secure the safe operation of his aircraft. It does not in any way relieve an operator or an aircraft commander of his responsibility for compliance with statutory requirements and for the safe conduct of a particular flight. International agreements and Hong Kong legislation are generally based on the concept that the ultimate responsibility for the safety of flight operations rests with the operator and the commander. The issue of a Certificate, and the work of the CAD in that connection, do not entail any departure from this general principle.
- 3.2 To a large extent the statutory requirements relating to the operation of aircraft are written in general terms. This is in accordance with the principle of operator's responsibility and helps to facilitate the development of the operating standards and techniques best suited to particular circumstances and conditions. The competence of an operator to secure the safe operation of his aircraft will therefore depend, in part, upon the manner in which he applies the statutory requirements of his particular operations. It is important, nevertheless, to appreciate that in the last resort the interpretation of the statutes is a function of the judiciary and that neither the issue of a Certificate nor the expression of any view in this Section should be taken as an indication to the contrary, or as a modification of any statutory requirements.

### **4 APPLYING FOR AN AIR OPERATOR'S CERTIFICATE (AOC) OR A VARIATION TO AN AOC**

- 4.1 The application for an AOC or a variation to an AOC should contain the following essential information:
- 4.1.1 CAD Form DCA61A of key staff members responsible for AOC maintenance support.
- 4.1.2 Types of aircraft, communications and navigation equipment, instruments and major items of equipment to be used;
- 4.1.3 Manuals and documents as described in the following paragraphs:
- a) arrangements for maintenance and inspection of aircraft and associated equipment;
  - b) area of operations and bases from which operations will be conducted; and
  - c) detailed description of how the applicant intends to show compliance with each maintenance-related provision of the applicable Hong Kong aviation regulations.

- 4.2 The CAD Airworthiness Office must also be informed whenever a change is made:-
- 4.2.1 of the supporting maintenance organisation; note that a minimum of 28 days notice of the change is required;
  - 4.2.2 in the routes operated, where this involves changes to en-route maintenance arrangements;
  - 4.2.3 in the number of aircraft operated, where this affects the ability of the maintenance organisation to provide full support;
  - 4.2.4 in any of the details included in the CAD document - Acceptance of Maintenance Support Arrangements.
- 4.3 The grant or variation of an AOC, or acceptance of any changes made to previously accepted arrangements, will be subject to a favourable assessment of the arrangements for maintenance specified in this Chapter.

Investigations will be undertaken by the CAD Airworthiness Office as necessary, according to the particular circumstances.

- 4.4 Notification that arrangements for maintenance support are acceptable will be by means of Form - Acceptance of Maintenance Support Arrangements for Holders of Air Operators' Certificates. A specimen document is included in Appendix A to this Chapter.
- 4.5 Where it is desired to operate aircraft temporarily away from the normal operational base, at another base outside Hong Kong, the Director may agree to maintenance being completed for a specified period at the places from which such operations are conducted.
- 4.6 Application for an AOC for the operation of lease aircraft not registered in Hong Kong will not be approved. Only in very exceptional cases that CAD may allow an AOC holder to vary its approval for the operation of lease aircraft not registered in Hong Kong or to lease his aircraft for use outside Hong Kong. The maintenance arrangements can be complex and may involve CAD in addition to other authorities.

Operators wishing to become involved in such leases should contact the CAD Airworthiness Office at the earliest opportunity for further guidance.

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**CHAPTER 1 - APPENDIX A**

**CIVIL AVIATION DEPARTMENT  
Airworthiness Office**

**ACCEPTANCE OF MAINTENANCE SUPPORT ARRANGEMENTS  
FOR HOLDERS OF AIR OPERATOR'S CERTIFICATE**

<b>OPERATOR</b>	:	
<b>AOC NO.</b>	:	
<b>AIRCRAFT TYPES</b>	:	

**AIRWORTHINESS COORDINATION**

Airworthiness coordination is the responsibility of the undermentioned organisation and is controlled in accordance with the procedures

Exposition Reference:

**MAINTENANCE ORGANISATION**

All maintenance requiring the issue of Certificates of Release to Service is to be completed under the control of:

**LOCATIONS**

Scheduled Maintenance Inspections may be completed only at locations at which the Maintenance Organisation is approved to perform such tasks, as defined in the relevant Company Exposition. Additional locations require CAD acceptance in each case.

**LIMITATIONS**

**MAINTENANCE**

Maintenance is to be completed in accordance with the requirements of the Approved Maintenance Schedule

**Schedule Reference**

**Aircraft Type**

Date of acceptance:  
Issue

for Director-General of Civil Aviation

**Any changes to the arrangements defined in this document must be notified to the Civil Aviation Department as required in [Condition No. \*] of the associated Air Operator's Certificate.**

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\* The condition regarding notification of change in employment of the maintenance contractor(s).

## **CHAPTER 2 - MAINTENANCE SUPPORT ARRANGEMENTS**

### **1 GENERAL**

- 1.1 It is the responsibility of the Operator to satisfy the Director-General of Civil Aviation [DGCA] that his maintenance support arrangements are to a satisfactory standard. The Operator may have his own maintenance organisation or may contract-out his maintenance to another organisation acceptable to the Director-General.
- 1.2 The Operator remains responsible for the safe operation of his aircraft when accomplishment of maintenance is contracted out and must therefore be satisfied with the standards of airworthiness achieved by the contractor. The Operator must monitor the contractor's response to the provisions of the maintenance agreement, employing such technical resources as are necessary to achieve this task.
- 1.3 Maintenance support arrangements will normally be based on an organisation approved by the Director in accordance with HKAR-145 for the maintenance of the type of aircraft concerned. Operator shall not operate an aircraft for commercial air transport unless the aircraft is maintained and released to service by an organisation approved by the Director-General in accordance with HKAR-145.
- 1.4 In considering the maintenance of aircraft, for the purpose of this document, maintenance is taken to include the overall control of airworthiness and the accomplishment of scheduled and unscheduled servicing and inspection tasks.

An organisation may be acceptable to the Director-General for maintenance support without all of the necessary facilities to accomplish certain maintenance tasks provided contracted arrangements exist with a facility acceptable to the Director-General.

- 1.5 All maintenance support organisations must have management systems to ensure effective support of the Operator's fleet of aircraft for which they have responsibility, over the whole of the routes operated. Quality Control and Assurance must be exercised as necessary to achieve satisfactory standards of continuing airworthiness.

### **2 CERTIFYING PERSONNEL - AUTHORISATIONS**

- 2.1 In the case of aircraft maintained under terms of a CAD Approval granted in accordance with the requirements of HKAR-145, personnel must be authorised in accordance with Appendix No. 3 to HKAR-1 Sub-section 1.8-13.

Such authorisations are normally only granted to employees of the approved organisation, however, the authorisation of personnel employed by other organisations is also permitted, subject to the provisions of HKAR-1 Sub-section 1.8-13 Appendix No. 3.

- 2.1.1 Who are employed as full-time members of the staff by the Operator for whom the approved organisation is contracted to provide maintenance support for the purposes of an Air Operator's Certificate, or
- 2.1.2 who are employed by another maintenance organisation holding CAD Approval for the type of aircraft concerned, for the purposes of completing defect rectification and line maintenance tasks only, provided there is a formal maintenance agreement between the two organisations, or
- 2.1.3 who are employed by an organisation located outside Hong Kong, contracted to perform defect rectification and line maintenance tasks only, who comply with the requirements of paragraph 2.1 of Appendix No. 3 to HKAR-1 Sub-section 1.8-13, except that the Director may accept an alternative to paragraph 2.1 (d) and (e) in a particular case.

NOTE: Provisions for the authorisation of personnel employed outside Hong Kong, or under the terms of a sub-contractor are contained in HKAR-1 Sub-section 1.8-13, where more detailed explanations of personnel authorisations and acceptable alternative qualifications are given. These provisions are amplified in Airworthiness Information Leaflet AD/IL/0005.

### **3 SCHEDULED MAINTENANCE INSPECTIONS**

- 3.1 The CAD approval of aircraft maintenance or overhaul organisations normally refers to one address shown on the Approval Certificate as the address where work will be undertaken within the terms of the approval. This location is usually the main base of the organisation. Additional subsidiary bases may exist, where suitable facilities and a supporting maintenance control organisation are provided, which may be added to the CAD Approval after investigation. Scheduled Maintenance Inspections (SMI) are normally accomplished at such approved locations.
- 3.2 The Approval Certificate in which the CAD approval is defined also permits maintenance tasks to be accomplished at other locations as shown in the company's Exposition. This is intended to take account of minor locations which may be classed as either a base, or a line maintenance station at which Scheduled Maintenance Inspections take place.
- 3.3 Supporting maintenance organisations must ensure that Expositions, or a related document such as a Line Maintenance Manual, include details of the facilities, procedures, organisation and scope of work to be accomplished at each location where Scheduled Maintenance Inspections take place.

**4 STAFF NUMBERS**

- 4.1 The organisation providing maintenance support must satisfy the Director that it has a sufficient number of staff, including qualified maintenance personnel, to meet the demands which will be placed upon it. Support appropriate to the route pattern, transit frequency and maintenance requirements of the Operator must be provided at main bases and route stations.
- 4.2 The Director will require assurance that shift duty periods are adequately staffed and will effectively enable scheduled and unscheduled tasks to be performed. Particular attention should be paid to ensuring that adequate staff are available to perform tasks of airworthiness significance in a proper manner. Company policies in respect of maintenance personnel duty periods should be made known to the Director.
- 4.3 The licensed and authorised personnel employed by the maintenance support organisation must be appropriately qualified to perform the tasks required, including the issue of Certificates of Maintenance Review and of Certificates of Release to Service for Scheduled Maintenance Inspections and the rectification of defects.

**5 TRAINING**

- 5.1 Maintenance organisations must have a programme of training to ensure that:-
- 5.1.1 All maintenance personnel are to be adequately trained to perform the duties required of them. The training programme established by an Operator for maintenance personnel shall include training in knowledge and skills related to human performance including co-ordination with other maintenance personnel and flight crew.
- 5.1.2 Personnel required to issue Certificates of Maintenance Review and Certificates of Release to Service receive familiarisation training on the aircraft type and instruction in the correct operation of the Operator's airworthiness control procedures to enable them to perform these tasks on the type of aircraft for which support is being provided.
- NOTE: Requirements for the training of persons engaged in the maintenance of aircraft in accordance with the requirements of Appendix No. 2 to HKAR-1 Sub-section 1.8-13.
- 5.1.3 Persons contracted to perform line maintenance tasks through maintenance agreements are trained in any significant differences which exist between the Operator's aircraft and that which they are normally employed to maintain together with any relevant company procedures they are required to observe.

- 5.1.4 Personnel engaged in maintenance-related tasks receive refresher training at regular intervals covering any changes to the aircraft and its maintenance, taking into account the results of in-service experience gained by the Operator and that published by the aircraft, engine and equipment manufacturers. Attention should also be paid to changes in company procedures, the AN(HK)O and Hong Kong Aviation Requirements.
- 5.2 Records should be maintained of all training undertaken by personnel including any results of assessments or examinations.
- 5.3 Training must include formal instruction and practical experience.
- 5.4 Management, Quality Assurance and other relevant personnel should be trained in the techniques of maintenance management and the achievement of airworthiness appropriate to the posts held.
- 5.5 The number of maintenance personnel, including management, supervisors, quality audit staff and mechanics to be trained before the introduction into service of a new type of aircraft, should be agreed with the Director. Numbers should take into account the complexity of the aircraft and its systems, the fleet size, the anticipated pattern of aircraft utilisation and the organisation's previous experience of similar aircraft.

## **6 TEMPORARY MAINTENANCE BASES**

- 6.1 When an Operator informs the Director that he proposes to operate and control the maintenance of an aircraft temporarily away from the normal operating base, at another self-contained base, the Director may agree to maintenance being completed for a specified period at the place from which such operations are conducted, without amendment of the company Approval or Exposition.
- 6.2 If the aircraft is operated outside Hong Kong by the AOC holder, application should be made to the CAD Airworthiness Office, for approval of the arrangements. Depending on the nature and duration of the operation, the Director may require submission either of a full description of the arrangements in the form of a report or of the CAD Form - AOC, Temporary Aircraft Maintenance Base.
  - 6.2.1 The Director would prefer, wherever possible, that the arrangements are described and submitted in the form of an entry in the Operator's Line Maintenance Manual, or other line maintenance instruction, thereby ensuring that maintenance personnel are fully acquainted with the arrangements and their individual responsibilities.
  - 6.2.2 Where the form mentioned in 6.2 is considered to be a suitable method of application for approval, copies of the form will be provided by the CAD. A specimen is shown at Appendix A to this Chapter.
  - 6.2.3 If the aircraft is to be operated outside Hong Kong but not by the AOC holder application should be made to the CAD Airworthiness Office for approval of the maintenance arrangements during the period of the lease.

**CHAPTER 2 - APPENDIX A**

**Civil Aviation Department  
Airworthiness Office**

**AIR OPERATOR'S CERTIFICATE - TEMPORARY AIRCRAFT MAINTENANCE BASE †**

**1 GENERAL**

- (a) Name of Operator .....
- (b) Name of Station .....
- (c) Address of Station .....  
.....  
..... Telephone No. ....
- (d) Organisation responsible for maintenance:  
Aircraft/Engine .....  
Other .....
- (e) Designation and frequency of maintenance checks to be completed .....  
.....  
.....
- (f) How many aircraft is it anticipated will use this base:  
  
No. .... Type ..... Utilisation per month  
No. .... Type ..... Utilisation per month
- (g) Maintenance will be carried out under supervision of:  
  
LAE'S ..... \*Yes/No  
Authorisation/Approval ..... \*Yes/No

**2 STAFF**

- (a) Persons in charge: Aircraft/Engine ..... Other.....  
Responsible for Engineering to .....
- (b) Total Engineering Staff .....
- (c) Qualified staff, as below:-

Name	Licences and/or Authorisations	

NOTE If insufficient space available use Remarks section at end.

† Where it is desired to operate aircraft temporarily away from the normal operational base, the Director may agree to maintenance being completed for a specified period at the places from which such operations are conducted. This application, stating the facilities and support available at such places, should be submitted to the CAD, Airworthiness Office. Acceptance will be notified by letter.

\* Delete as applicable

**CHAPTER 2 - APPENDIX A (Cont'd)**

3 FACILITIES (EQUIPMENT)

- (a) Is the size of the hangar adequate considering the types and the amount of work to be carried out? \*Yes/No
- (b) Are there adequate stands, steps, docking etc. to carry out maintenance, defect rectification and normal servicing? \*Yes/No
- (c) Are adequate workshops available?  
State what shops .....
- (d) Are facilities available for completing battery charging and capacity checks? \*Yes/No
- (e) Are there facilities available for testing systems and equipment? \*Yes/No  
State which .....
- (f) Is any work to be undertaken in the Open? \*Yes/No  
State tasks to be completed .....
- Is working accommodation, heating and lighting adequate? \*Yes/No
- (g) Is any provision made for the repair of cargo containers and cargo retention equipment? \*Yes/No
- (h) Are all the tools and test equipment required for work to be completed available? \*Yes/No  
or are they supplied from: .....
- (i) Have the LAE's/certifying engineers been given adequate terms of reference? \*Yes/No
- (j) Are there adequate engineering staff to carry out the planned work at this base? \*Yes/No
- (k) Additional Support Arrangements
  - for (i) Staff are available from .....
  - (ii) Equipment .....
  - (iii) NDT and other test facilities .....

4 STORES

- (a) Is there an adequate quarantine stores? \*Yes/No
- (b) Is there an adequate bonded stores? \*Yes/No
- (c) The person responsible for the stores and related records is: .....
- (d) Are there separate stores for flammable materials, oils and greases etc? \*Yes/No
- (e) Identification of parts in stores is by .....  
(i.e. batch number, App. Certificate No.)
- (f) Items with shelf life are controlled by: .....
- (g) Where are spares obtained from? .....
- (h) All spare engines are labelled showing date of inhibiting, where applicable and any component 'robbery'. \*Yes/No

*Delete as applicable*

**CHAPTER 2 - APPENDIX A (Cont'd)**

**5 TECHNICAL INFORMATION AND PROCEDURES**

- (a) Are relevant maintenance manuals available? (Paper/film/fiche)\* \*Yes/No
- (b) Are applicable company maintenance instructions, Engineering or QC Notices etc held relevant to the aircraft maintained? \*Yes/No
- (c) Will all or part of the Company Exposition/Engineering Manual be available on-site? \*Yes/No
- (d) Are maintenance schedule worksheets available relevant to the checks to be completed? \*Yes/No
- (e) Are service bulletins, newsletters, etc. available? \*Yes/No
- (f) Are copies of AN(HK)O's\*, HKAR-1, Airworthiness Notices, AOC Requirements Document and other relevant publications available? \*Yes/No
- (g) On completion of worksheets, these are filed
  - (i) at this base \*Yes/No
  - or
  - (ii) forwarded to: .....
- (h) Are history cards in use for every aircraft, and held at this base (alternatively state below how lifed components/tasks are controlled): \*Yes/No
- (i) Duplicate copies of the technical log are removed and filed at: .....
- (j) Are deferred defects controlled locally, transmitted to main base daily or both? State which: .....
- (k) Are defects monitored for repetition? \*Yes/No
- (l) Are all defects records forwarded to main base? \*Yes/No
- (m) Are copies of log book entries forwarded to main base? \*Yes/No
- (n) Are publications and forms adequately controlled and amended to date? \*Yes/No

**6 SUPERVISION AND PERIODIC CHECKS**

- (a) Is all test and servicing equipment checked periodically and recorded? \*Yes/No
- (b) Are refuelling installations checked regularly for water? \*Yes/No
- (c) Will quality surveillance checks be made on the base by the Chief Engineer/Quality Manager or their representative at intervals to ensure that company requirements and standards are being met? \*Yes/No  
(State interval of routine checks                      months)  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*\* Delete as applicable*



## **CHAPTER 3 - CONTRACTING-OUT MAINTENANCE**

### **1 GENERAL**

- 1.1 The management and accomplishment of engineering support may be achieved by the Operator using his own or an associated maintenance organisation. Alternatively all or part of the arrangements may be contracted to a separate organisation.

Contracted arrangements for engineering support and maintenance do not absolve the Operator from the overall responsibility for ensuring the safe operation and continuing airworthiness of the aircraft.

- 1.2 Where the Operator does not maintain the aircraft he operates using only his own resources, full details of the division of responsibilities between the Operator and the contracted maintenance organisation must be included in an agreement between the two parties. Matters to be addressed in such an agreement are contained at Appendix A to the Chapter.

- 1.3 Where an Operator contracts-out part or all of the maintenance to a separate organisation, he must nominate a person for engineering liaison purposes. This person will be responsible to the Operator for planning the timely presentation of the aircraft to the engineering support organisation for all contracted maintenance; for liaison on all matters relating to the maintenance contract or agreement and for airworthiness matters affecting the safe operation of the aircraft. Where the Operator has several types of aircraft, a different person may be nominated for each fleet.

The Operator's representative(s) should visit the contracted maintenance organisation at the inception of the agreement, and periodically thereafter, to ensure that the standards agreed are being maintained. Reports of all such visits should be kept and made available to the Director on request.

- 1.4 An arrangement whereby more than one maintenance organisation is contracted by an Operator in respect of the airworthiness control of a particular aircraft type will not normally be acceptable to the Director, other than for maintenance support at route stations or where a distinct division of aircraft is established e.g. different maintenance schedules apply.

- 1.5 An Operator may only arrange separately for the maintenance, overhaul and repair of engines or other components with the knowledge and agreement of his principal maintenance contractor.

- 1.5.1 In order to be able to discharge his responsibilities for continued airworthiness and to issue Certificates of Maintenance Review (CMR), the contractor must satisfy himself on a continuing basis that the requirements of the approved maintenance schedule are being complied with, including condition monitoring and reliability reporting, and be made aware of any significant performance trends.

- 1.5.2 Responsibilities for the assessment and incorporation of manufacturer's Service Information and for compliance with mandatory requirements must be clearly defined in the agreement.
- 1.6 In its assessment of the overall engineering support arrangements provided by the Operator, the Director will require to examine and may require to hold copies of all agreements, including sideletters and addenda, between the parties concerned.
- 1.7 Any proposal to change the maintenance arrangements, e.g. a change to another maintenance organisation or significant organisational, procedural or technical change to a maintenance agreement, must be notified to the Director at least 28 days prior to the proposed date of implementation.
- 1.8 Arrangements other than in accordance with this chapter will need to be specifically agreed with the Director.

## **2 CONTRACTING-OUT FULL SUPPORT**

- 2.1 The Operator may contract full maintenance support to an organisation approved by the Director for the maintenance or overhaul of the type(s) of aircraft concerned.
- 2.2 The Operator must ensure that maintenance organisation competently discharges its responsibilities under the agreement, to his satisfaction, and is responsible for satisfying the Director that the organisation meets the requirements of this document, insofar as they relate to the contracted work.
- 2.3 Written agreements should clearly define what responsibility for action is allowed to the maintenance organisation without prior consultation, and what tasks require agreement by the Operator.
- 2.4 Whenever an aircraft is presented for scheduled or unscheduled maintenance, it is essential that a precise indication is given of the inspections required, all defects known to exist on the aircraft plus any additional work required to be carried out (after consultation with the maintenance organisation as necessary).

NOTE: Operators must appreciate that a maintenance organisation cannot carry out work or certify inspections without their instructions or agreement and it follows that they should be quite specific when making known their work requirements to the organisation of their choice. Difficulties regularly occur because there is a misunderstanding between customer and maintenance organisation as to the former's requirements.

## **3 CONTRACTING-OUT LINE MAINTENANCE SUPPORT**

- 3.1 Line maintenance is defined as those maintenance activities required to prepare an aircraft for flight including:-

Preflight inspections and servicing,  
Daily inspections,  
Minor scheduled maintenance not requiring input to main base,  
Defect rectification.

A written agreement should exist between the Operator or his principal contracted maintenance organisation and the organisation contracted for the performance of line maintenance, detailing the tasks to be performed on behalf of the Operator.

- 3.2 The arrangements must be defined in company instructions so that responsibilities, procedures and communication paths are made clear to all concerned.
- 3.3 The authorisation of maintenance personnel employed by the line maintenance contractor must conform to any requirements and limitations imposed by the conditions of the CAD Approval held by the Operator or his principal maintenance contractor as appropriate.
- 3.4 It is the responsibility of the Operator or his principal maintenance contractor to ensure that the continuing performance of the line maintenance contractor is such as to ensure safe operation of the Operator's aircraft.

#### **4 CONTRACTING-OUT GROUND HANDLING**

- 4.1 Operators may enter into Ground Handling Agreements with other operators or organisations for the provision of services associated with aircraft arrival, turnround and dispatch. In these cases a written agreement should exist detailing the tasks to be performed on behalf of the Operator.
- 4.2 Where appropriate the IATA Standard Ground Handling Agreement AHM 810 provides an acceptable basis for an agreement; however, it is essential that maintenance or flight crew personnel responsible for accepting the aircraft for flight are made aware of any matter which is not included in the agreement at that station.
  - 4.2.1 Typical matters which may remain the responsibility of the Operator or his maintenance organisation include:-
    - 4.2.1.1 Open and secure aircraft hold doors: secure and lock when loading is complete.
    - 4.2.1.2 Drain water from aircraft fuel tanks.
    - 4.2.1.3 Maintain communications between Flight Deck and ground personnel.
  - 4.2.2 This list is not exhaustive and may vary from Operator to Operator and station to station. Company instructions to Flight Crew and maintenance personnel must identify responsibilities in each case.

- 4.3 It is the responsibility of the Operator or his principal maintenance contractor to ensure that the continuing performance of the ground handling contractor is such as to ensure safe operation of the Operator's aircraft, and that necessary training has been performed.

## **5 CONTRACTING-OUT TO MAINTENANCE ORGANISATIONS LOCATED OUTSIDE HONG KONG**

- 5.1 Maintenance support may only be contracted to an organisation located outside Hong Kong if it is appropriately approved by the Director or by the responsible authority of the organisation. Where the organisation is CAD approved, the normal requirements of this Chapter will apply. The Director will not normally accept the contracting-out of full support to a maintenance organisation located outside Hong Kong unless that organisation holds CAD Approval for the particular aircraft.
- 5.2 If the organisation does not hold CAD Approval the following conditions will apply:-
- 5.2.1 The maintenance organisation or Operator in question must be approved by its responsible authority.
- 5.2.2 The national airworthiness standard under which the maintenance organisation has been approved will have to be known by the Director to be comparable with that existing in Hong Kong.
- 5.2.3 The arrangements must provide for the Director to be allowed to inspect, upon notification, the facilities at any of the nominated locations.
- 5.2.4 Details of the proposed maintenance arrangements must be acceptable to the Director.
- 5.2.5 A formal maintenance agreement in accordance with this Chapter must be established, appropriate to the tasks being undertaken. Such an agreement should aim to ensure an airworthiness standard comparable with Hong Kong airworthiness requirements, paying particular attention to the following:-
- 5.2.5.1 That the method of certifying individual maintenance tasks and the responsibilities of nominated signatories ensure that the authority given to the signatories and the nature of the work they certify provide equivalence to Hong Kong certification. The signatories must be persons employed by that maintenance organisation located outside Hong Kong.
- 5.2.5.2 That all work is completed and certified in accordance with the maintenance organisation or Operator's approved technical procedures.
- 5.2.5.3 That the work undertaken is within the scope of the approval of the organisation granted by the responsible authority.
- 5.2.5.4 That all applicable HK AOC Holder/Maintenance Organisations' procedures or requirements are covered, e.g. duplicate inspections, fuel flow tests, flight tests, compass swings etc.

5.2.5.5 That necessary maintenance manuals or equivalent technical literature are provided and worked to, except for authorised deviations.

5.2.5.6 That all replacement parts for the specific aircraft are appropriately certified and are to a satisfactory standard, in particular replacements for any system or component which may have been the subject of Hong Kong Special conditions or additional requirements prior to certification in Hong Kong.

NOTE: (a) These provisions do not obviate the need for a Certificate of Maintenance Review, and a Certificate of Release to Service on completion of scheduled maintenance inspections, issued in accordance with the provisions of Air Navigation (Hong Kong) Order.

(b) The Director will assess the qualification standards achieved by the contracted organisation when granting personnel authorisations.

## **6 CONTRACTING-OUT ENGINE MAINTENANCE**

6.1 When an Operator chooses to contract-out maintenance of engines independently from the overall arrangements existing for maintenance support of the aircraft, it is essential that the primary maintenance contractor:-

6.1.1 is fully in agreement with the proposed arrangements and

6.1.2 is kept continuously aware of engine condition monitoring and any adverse trends in reliability or performance which arise, if he is not directly a party to such monitoring,

6.1.3 is made aware of the status of engines fitted to aircraft in respect of modifications, service bulletins and airworthiness directives,

6.1.4 liaises with the engine maintenance contractor in respect of the requirements of the approved maintenance schedule for the aircraft so that the engine maintenance reflects the needs of the aircraft for airworthiness.

6.2 At all times the liaison between the aircraft and engine maintenance organisation must be such as to enable the appropriately authorised person to carry out maintenance reviews and issue the required certificate (CMR) and safely discharge his statutory responsibilities when doing so.

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**CHAPTER 3 APPENDIX A - MAINTENANCE AGREEMENT**

- 1 Where an Operator chooses to contract maintenance to another organisation, a written agreement must be drawn up indicating the divisions of responsibility between the two parties for the overall support of the aircraft and for compliance with statutory regulations and other relevant requirements.
- 2 The purpose of the agreement is to demonstrate a firm commitment by the two parties to the maintenance support of the aircraft in the operation for which application has been made for an Air Operator's Certificate.
- 3 It is strongly recommended that the parts of the agreement dealing with maintenance are sub-divided into those tasks to be accomplished by the contractor and those tasks which will remain the responsibility of the Operator. This is particularly necessary where, for example, the Operator retains responsibility for line maintenance or spares provision.
- 4 The agreement should address the following matters:-
  - 4.1 *general arrangements* for support of the operation by the maintenance organisation, and for technical liaison between Operator and Maintenance Organisation, including the names of both organisations; contract identification and date; a clause referring to termination or alternation of the contract;
  - 4.2 *accomplishment of maintenance* at the approved locations of the maintenance organisation;
  - 4.3 *provision of appropriately authorised/licensed maintenance personnel* sufficient in numbers for the completion and certification of scheduled maintenance, the rectification of defects and the completion of duplicate inspections;
  - 4.4 *training of maintenance personnel* and, where necessary, the Operator's flight crews;
  - 4.5 *arrangements for line maintenance and ground handling* at the Operator's route stations, including major unscheduled arisings such as engine changes and defects requiring major dismantling or jacking;
  - 4.6 *control and development of the Maintenance Schedule* in response to service experience and manufacturers recommendations, the management and operation of reliability programmes, the preparation of documentation needed to implement the schedule and the arrangements for granting variations to the maintenance schedule requirements;
  - 4.7 *airworthiness occurrence control* and reporting to the manufacturer and the CAD, including MOR, and the control of *deferred and repetitive defects*;
  - 4.8 *maintaining logbooks*, component service history, maintenance and other technical records and the transmission of Sector Record page information from the Operator to the maintenance organisation;

**CHAPTER 3 APPENDIX A (Cont'd)**

- 4.9 *manufacturer's Service Bulletins/Information*, received, assessed and incorporated into modifications and manufacture's technical programmes;
- 4.10 *compliance with mandatory requirements* including mandatory modifications and inspections, and Airworthiness Directives, and for responding to other maintenance and airworthiness requirements published by Responsible Authorities;
- 4.11 *provision of spares, their storage and acceptance*;
- 4.12 *ensuring the availability of the necessary tools and equipment* to complete the scheduled maintenance and any other work arising under the terms of the agreement;
- 4.13 *provision of suitable maintenance accommodation* at all locations where maintenance takes place, appropriate to the task;
- 4.14 *quality auditing of the maintenance arrangements*, including in particular the systems and procedures employed to achieve the control of airworthiness, at main base, line stations and en-route wherever support and ground handling takes place.
- 5 Details of the financial aspects of maintenance agreements may be omitted.
- 6 A copy of the signed agreement must be sent to the CAD Airworthiness Office. Access must be given to any side-letters or sub-contracted arrangements for the provision of special services such as radio, avionics, NDI etc., or for any other support including that provided at line stations. Copies of such additional arrangements may be required.

## **CHAPTER 4 - AIRWORTHINESS CONTROL PROCEDURES**

### **1 GENERAL**

Procedures described in company manuals and/or required to be provided by this publication must be published in company documents and made available to staff concerned as necessary to ensure that they are aware of the procedures and their own resultant duties and responsibilities.

### **2 MAINTENANCE SCHEDULES - CONTROL AND DEVELOPMENT**

- 2.1 The Operator shall provide for the use and guidance of maintenance and operational personnel concerned, a maintenance schedule. The design and application of the maintenance schedule shall observe human factors principles. A copy of the proposed Maintenance Schedule must be prepared and submitted for approval to the CAD Airworthiness Office. When the schedule is approved the applicant will be formally notified by means of a Maintenance Schedule Approval Document, which also defines the frequency and conditions for issue of Certificates of Maintenance Review and Release to Service for Scheduled Maintenance Inspections (SMI).

NOTE: CAD Document No. 452, Approval of Maintenance Schedules, gives guidance in respect of the preparation and submission of Schedules for CAD approval.

- 2.2 Procedures must ensure that the data contained in an approved schedule is reviewed periodically, e.g. at minimum intervals of six months, with the object of ensuring that the detailed schedule requirements continue to have practical applicability in the light of experience and adequately meet the maintenance needs of the aircraft if continuing airworthiness in the respective operating circumstances is to be ensured.
- 2.3 Reviews must take account of variations from the original certification standard of the aircraft which may have occurred as a result of modifications and respond to the recommendations of the manufacturer contained in maintenance manuals and Service Bulletins.
- 2.4 Changes in the use of aircraft may affect the conditions for approval of the maintenance schedule, for example with respect to annual utilisation, average flight duration and operating environment. Amendments to schedules and to engine maintenance programmes must be submitted for approval in response to significant changes.
- 2.5 A continuous analysis must be undertaken of defects arising on the aircraft during flight and at maintenance inputs, from Technical Logs and from worksheets raised during Scheduled Maintenance Inspections, particularly those where major structural inspections are undertaken. Results of the analysis must be used to amend the maintenance schedule as appropriate to eliminate repetitive defects and trends.
- 2.6 Requirements for the Maintenance of Aircraft are contained in HKAR-1 Sub-section 1.6-2, including requirements for Maintenance Schedules, Certificates of Maintenance Review, Certificates of Release to Service, Duplicate Inspections and the Retention of Records. Appendix 1 to HKAR-1 Sub-section 1.6-2 describes an acceptable means of compliance with requirements for Condition Monitored Maintenance Programmes.

- 2.7 It is particularly important that maintenance schedule reviews take account of the age and utilisation of the aircraft and the continuity of corrosion control programmes. More frequent maintenance may be required as aircraft grow older.
- 2.8 Copies of all amendments to the maintenance schedule shall be furnished promptly to all organisations or persons to whom the maintenance schedule has been issued.

### **3 THE CERTIFICATE OF MAINTENANCE REVIEW (CMR)**

- 3.1 Before issuing the Certificate, the CMR signatory is required to ensure that all maintenance is complete, all mandatory inspections and modifications that are due have been complied with, all defects have been rectified or deferred in accordance with company procedures and that all necessary Certificates of Release to Service have been issued.
- 3.2 Company procedures must permit access in respect of the aircraft being certified to the approved maintenance schedule and check control system, the mandatory inspection/modification control system, the defect control system, all technical records including worksheets, and to aircraft defects. In the case of computer controlled records, access must likewise be provided.
- 3.3 Quality Control audit records must be available to the CMR signatory on request, relative to the aircraft being cleared, such that he may discharge his responsibilities under the AN(HK)O.

### **4 DEFECTS AND OCCURRENCES**

- 4.1 The Operator of an aircraft shall monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information to the Director-General. An assessment of both the cause and any potentially hazardous effect of defects or combination of defects, and occurrences must be made in order to initiate any necessary further investigation and analysis.
- 4.2 A system of assessment should be in operation to support the continuing airworthiness of aircraft and to provide a continuous analysis of the effectiveness of the Operator's control systems in use.
- 4.3 The system should provide for:-
- 4.3.1 *Significant Incidents and Defects.* The monitoring on a continuous basis of incidents and defects that have occurred in flight and of defects found during maintenance and overhaul, highlighting any that appear significant in their own right.
- 4.3.2 *Repetitive Incidents and Defects.* The monitoring on a continuous basis of defects occurring in flight and found during maintenance and overhaul, highlighting any that are repetitive.

- 4.3.3 *Deferred and Carried Forward Defects.* The monitoring on a continuous basis of deferred and carried forward defects.
- 4.3.4 *Unscheduled Removals and System Performance.* The analysis of unscheduled component removals and of the performance of aircraft systems and its use as part of a maintenance programme.

## **5 OCCURRENCE REPORTING TO MANUFACTURERS**

- 5.1 For each aircraft type operated, the Operator should have procedures for ensuring that the organisation responsible for the type design of the aircraft receives adequate reports of occurrences to that type, to enable it to issue appropriate service instructions and recommendations to all Operators.
- 5.1.1 Where the performance of maintenance is either partially or wholly assigned to a maintenance organisation(s), service experience on faults, malfunctions, defects, etc., of both the Operator and the maintenance organisation(s) should be transmitted to the organisation responsible for the type design. The information from the Operator should pertain to the operational and maintenance experience of its fleet. The information from the maintenance organisation should pertain to its maintenance experience of all aircraft designed by the organisation responsible for the type design.
- 5.2 Liaison with the manufacturer is necessary to establish whether published or proposed service information will resolve the problem or to obtain a solution to a particular problem.

## **6 MANDATORY OCCURRENCE REPORTING TO THE CAD**

- 6.1 In addition to reporting occurrences to manufacturers, an Operator's maintenance organisation has responsibilities for Mandatory Occurrence Reporting as required by the AN(HK)O in respect of public transport aircraft, the MTWA of which exceeds 2300 kg. Guidance on meeting the mandatory requirements is given in CAD 382 ('Mandatory Occurrence Reporting - Information and Guidance').
- 6.2 The maintenance organisation should operate procedures to discharge these responsibilities and personnel should be instructed as to their use. As far as possible these procedures should be integrated with the airworthiness occurrence control system.
- 6.3 Mandatory Occurrence Reports should normally be made to the Director through the person authorised under paragraph 8.1 of this Chapter. Where organisations do not have their own reporting systems which are acceptable to CAD (eg BASIS), form DCA 201 shown at Appendix A should be used.

- 6.4 An Operator who has contracted-out maintenance support may also need to submit occurrence reports direct to the Director and to liaise with the maintenance organisation to ensure that adequate follow-up action takes place, including the provision of supplementary reports.

This is particularly necessary where a maintenance organisation located outside Hong Kong is involved.

## **7 OTHER OCCURRENCE REPORTING TO THE DIRECTOR**

The organisation should ensure that such other reporting requirements as are prescribed from time to time are met: e.g. reporting of Bird Strikes in accordance with Aeronautical Information Circular 13/00 and reporting of Lightning Strikes.

## **8 RESPONSIBILITY FOR REPORTING OCCURRENCES**

- 8.1 Responsibility for co-ordinating action on airworthiness occurrences and for initiating any necessary further investigation and follow-up activity should be assigned to a suitably qualified senior person with clearly defined authority and status.

Operational and maintenance responsibilities may be combined in one individual as long as the necessary integration is provided by the organisation, i.e. where the Operator undertakes his own maintenance. If the performance of maintenance is either partially or wholly assigned to a maintenance organisation, the maintenance organisation should report all maintenance action taken and all discrepancies found to the Operator, thus enabling the Operator to monitor and assess both maintenance and operational experience and any mutual relationship. The Operator should have the expertise to fulfil this task or make contractual arrangements to obtain this expertise.

- 8.2 A suitably qualified engineer within the support organisation should be assigned responsibility for co-ordinating with the Operator's operational staff in connection with occurrences which have both airworthiness and operational implications.

This is particularly necessary where the Operator contracts out his maintenance, when it must be clearly shown who performs this task in both the Operations and Engineering Manuals.

- 8.3 The Operator should report all known discrepancies and adverse operational experience relevant to the work contracted to maintenance organisation, thus enabling the maintenance organisation to correct any possible technical cause of an operational problem.

## **9 DEFERRED AND CARRIED FORWARD DEFECTS**

9.1 The systems for controlling deferred and carried forward defects must be described in Operations and Engineering Manuals. When transferring a defect in the Technical Log to the deferred sheet or carrying forward a defect during a maintenance check, the conditions agreed with the Director for the control of deferred defects must be complied with.

NOTES: (1) Deferred defects are defined as those defects reported in operational service which are deferred for later rectification.

(2) Carried forward defects are defined as those defects arising during maintenance which are carried forward for rectification at a later maintenance input.

9.2 There should be a system to consider the cumulative effect of a number of deferred or carried forward defects occurring on the same aircraft. Any restrictions contained in the Minimum Equipment List must be considered. Whenever possible deferred defects should be made known to the flight crew during pre-flight briefing, prior to their arrival at the aircraft.

9.3 There should be a procedure to ensure that the period for which defects are deferred or carried forward reflects the importance of the defect as it affects airworthiness and/or safe operation. Limitation periods to be applied should be identified in the Exposition or Manual (e.g. flight hours, calendar time, number of sectors, return to base). The control system should ensure that the number of deferred defects and the length of time during which each defect is deferred are kept to a minimum.

9.4 There should be a procedure to ensure that deferred defects are transferred to worksheets at maintenance periods, and to ensure that deferred defects which have not been actioned during maintenance periods, are re-entered on to a new deferred defect record sheet. The original date of the defect must be retained.

9.5 There should be a procedure to ensure that the necessary components or parts are made available or ordered on a priority basis, and that they are fitted at the earliest opportunity.

9.6 There should be a cross reference in the Technical Log to enable each defect which has been deferred to be traced back to its original entry.

## **10 REPETITIVE DEFECTS**

10.1 There should be a system to control and monitor repetitive defects on a continuous basis appropriate to the number of aircraft operated and the nature of the operation. The system should ensure that the history of a particular repetitive defect is not lost at scheduled inspections. A limit to the number of times a particular defect may be repeated should be established, after which it should be brought to the attention of a senior person in the Organisation, usually the Quality Manager. This person is responsible for ensuring that positive action is taken to obviate a further repetition of the defect.

10.2 Defects should be recorded in a standardised way to assist in identifying which problems are repetitive. There should be an arrangement to ensure that line and outstation maintenance personnel have access to repetitive defect information.

## **11 INSTRUCTIONS TO MAINTENANCE PERSONNEL**

- 11.1 In addition to the technical and procedural contents of documents such as maintenance manuals and the Exposition prepared by the maintenance organisation, there is a need for a system of bulletins or instructions with which to advise maintenance personnel of matters of immediate technical importance, and to define company practices where these differ from other published information.
- 11.2 The maintenance organisation must therefore have a system for publishing instructions which should be:-
- 11.2.1 Distributed individually to maintenance personnel or in such way that each person has access to a copy and there is a record kept to show that he has seen each document issued.
- 11.2.2 Numbered sequentially and dated. Where instructions are revised an issue or revision number must be shown.
- 11.2.3 Identified as to content, e.g. by ATA Chapter or by aircraft type number so as to permit easy access to particular subjects.
- 11.3 The principal source of matters to be addressed by the issue of instructions is expected to be the in-service experience of the aircraft being operated and maintained, to which the maintenance organisation finds a need to respond with guidance to maintenance personnel. Other likely sources of information which should not be overlooked include CAD Airworthiness Notices, Occurrence Digests, GASIL, in-service experience reports and similar continuing airworthiness information published by airworthiness authorities and manufacturers.
- 11.4 Where instructions are issued which conflict with, or vary, information published by manufacturers or other sources it must be clearly shown which information takes priority. It must also be ensured that instructions cannot be construed as overriding published mandatory information or concern matters beyond the scope of the Approval held by the organisation.

## **12 TECHNICAL RECORDS**

- 12.1 A department responsible for the compilation and co-ordination of technical records should maintain a data recording system:-
- 12.1.1 Such that it is possible to ensure that the hours of service or elapsed times quoted in the approved Maintenance Schedule are not exceeded as regards components and structural assemblies, and that scheduled maintenance periods are adhered to.
- 12.1.2 To ensure the following records are kept for the periods as required by the AN(HK)O;
- 12.1.2.1 the total time in service (hours, calendar time and cycles, as appropriate) of the aircraft and all life-limited components;
- 12.1.2.2 the use of maximum contingency or intermediate contingency power, when this information is specified in the approved Maintenance Schedule or manufacturer's manuals as a basis for inspection or other necessary action;
- 12.1.2.3 the current status of compliance with all mandatory continuing airworthiness information;

- 12.1.2.4 appropriate details of modifications and repairs;
  - 12.1.2.5 the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the aircraft and its life limited components;
  - 12.1.2.6 the time in service and the date of the last inspection of all life limited instruments and equipment;
  - 12.1.2.7 the current status of the aircraft's compliance with the approved maintenance schedule; and
  - 12.1.2.8 the detailed maintenance records to show that all requirements for the signing of a maintenance release have been met.
- 12.1.3 To process the foregoing information into aircraft, engine and propeller log books or equivalent records, to maintain the records and documents concerning overhaul and repair work, component changes, mandatory modifications and inspections and to maintain the Modification Record Book (CAD 395).
- 12.2 A computer may be used as part of a technical records system with the agreement of the Director. In this case procedures should be instituted which will ensure that the computerised record will provide storage, preservation and retrieval to the same level as would have been achieved by hard copy records. CAD acceptance of computerised recording does not exempt the Operator or his contracted maintenance organisation from complying with the appropriate provisions of the AN(HK)O for the keeping and retention of records.

NOTE: Guidance material to identify the CAD attitudes to the acceptance of computer control systems is contained in Airworthiness Information Leaflet AD/IL/0004.

### **13 DOCUMENTATION FOR MAINTENANCE CHECKS**

- 13.1 The department responsible for technical records should also be responsible for the accuracy of the documents issued for a maintenance check and should maintain a procedure to ensure that only documents to the latest amendment state are issued, and that all superseded documents are withdrawn and cancelled. Working documents made available for use by hangar engineering staff such as worksheets or cards should include:-
- 13.1.1 A list of inspections, checks or work items required to meet the requirements of the approved maintenance schedule and adequate directions for their implementation.
  - 13.1.2 The part numbers and serial numbers (unless not relevant to component control) of all components to be removed and replaced, and their locations on the aircraft.
  - 13.1.3 Details of any modifications which have to be incorporated during the check.
  - 13.1.4 Any mandatory or special inspections, or any other checks which are required to be made by the company in addition to those required by the approved maintenance schedule.
  - 13.1.5 Detailed procedures for engine runs, power unit or propeller change, fuel flow tests, duplicate inspection of controls, landing gear retraction tests etc., as applicable.

- 13.1.6 A list of outstanding deferred and carried forward defects.
- 13.2 Additional worksheets or cards should be provided for recording the work completed as a result of the maintenance check and any defects arising from inspections.
- 13.3 All worksheets or cards should be readily identifiable and should bear an issue number. They should also be identified to associate them positively with the relevant items in the maintenance schedule. The procedures for documentation control should ensure that if any worksheet or card is mislaid or lost this will be readily apparent on completion of the check, and that each 'pack' of worksheets or cards is complete and certified before the aircraft is released for service.
- 13.4 Before issue, all worksheets or cards must be recorded on a 'workpack control' sheet which should also state the following:-
- 13.4.1 Name and CAD Approval reference of the maintenance organisation.
- 13.4.2 Aircraft type and registration letters.
- 13.4.3 The maintenance check to be carried out.
- 13.4.4 The date.
- 13.4.5 The approved maintenance schedule reference number and amendment state.
- 13.4.6 The name of the Operator whose aircraft is being maintained.
- 13.5 Technical records are deemed to be essential records and may not be destroyed without permission from the Director.
- 13.6 The compilation of maintenance check document may, alternatively, be allocated to a maintenance planning department, subject to the agreement of the Director. In such cases the company Exposition must contain details not only of the procedures of the planning department through which the documentation is compiled but also of the monitoring programme exercised by Quality Assurance.
- 14 **AIRWORTHINESS DIRECTIVES AND MANUFACTURERS TECHNICAL INFORMATION**
- 14.1 Maintenance organisations must have procedures and the necessary personnel to ensure that Airworthiness Directives are complied with as required. As on occasion, compliance with Airworthiness Directives has to be effected at very short notice, operators should ensure that they are able to receive this information at any time (by telex, telefax, etc.) and to develop the necessary actions. Moreover, when maintenance accomplishment is subcontracted, it must be clearly stated in the procedures as to who should be responsible for compliance with Directives.

14.2 When assessing the overall capability of the organisation to provide satisfactory maintenance support, the Director will take into account the organisation's arrangements for:-

14.2.1 The assessment of incoming technical information from manufacturers, including Service Bulletins, relating to relevant aircraft types.

NOTE: Manufacturer's service information is approved by the State of Design. Operators should be aware that the "approvals" made by different States of Design may have different meanings. An approval may mean that a recommended modification complies with the applicable airworthiness requirements. However, it may only mean that the modification does not impair airworthiness. It may mean that the State of Design agrees that the recommended action solves the problem. The exact nature of the approval is usually not indicated in the service information, and Operators should therefore ask the organisation responsible for the type design the meaning of the approval.

14.2.2 Initiating action as necessary on such information, particularly in relation to the Maintenance Schedule.

14.2.3 Responding to requests by the Manufacturer and the Director to have 'in-service' experience reports transmitted for their evaluation.

NOTE: The Director may require access to an Operator's assessments or manufacturer's service information to assist in evaluation of such information for the purpose of possible mandatory classification.

14.3 Although the manufacturer's service information is normally not made mandatory by the Director-General, the Operator should obtain and carefully assess the information. The Operator needs qualified staff to do the assessment.

When manufacturer's service information is received an immediate assessment must be made to establish priority of response. Matters of significant airworthiness importance, such as those having an impact on ETOPS flights, must be responded to promptly.

NOTE: CAD requirements for Extended Range Twin Operations (ETOPS) are contained in CAD 513.

14.3.1 Even if the performance of maintenance is either partially or wholly assigned to a maintenance organisation, the Operator remains responsible for the continuing airworthiness of the aircraft. This means that the Operator should have the expertise and personnel to perform the assessment of all relevant information and inform the maintenance organisation, especially if the maintenance organisation is located overseas, of all information made mandatory by the Director-General.

- 14.4 By means of Modification Record (CAD 395), Technical Records, Log Books or other means adopted by the organisation it must be possible at any time to establish the record of compliance with Directives and Service Information for each of the Operator's aircraft.
- 14.5 Operators must ensure that the relevant aircraft manufacturer is aware they are users of his aircraft so that all relevant service information, details of in-service experience of the aircraft and amendments to manuals, including the Flight Manual, are received and embodied in a timely manner. This is especially important where the Operator is not the original owner of the aircraft, or it has been leased from the owner.
- 14.6 Where manuals, including the Flight Manual, have been prepared or amended by an agency other than the manufacturer, the Operator must ensure that amendments are prepared as necessary, submitted to the Director through an appropriately approved organisation for approval and incorporated into manuals promptly.
- 14.7 The technical library must hold and make available to personnel concerned the necessary technical data, e.g. CAD publications, the AN(HK)O, manufacturer's manual, any relevant service information, any other related literature appropriate to the aircraft types covered by the AOC and copies of appropriate company manuals, procedures and instructions. A person must be appointed to be responsible for the technical library.
- 14.8 Arrangements must be made for:-
- 14.8.1 The supply of amendments, so that all publications are kept up-to-date, and for departments concerned to be notified of such amendments, and of any additional technical information relevant to the work undertaken.
- 14.8.2 Maintenance manual information recorded on microfilm, microfiche or disk to be checked at specific intervals for amendment state and legibility and any temporary amendments to be kept available adjacent to each reader.
- 14.9 Arrangements should be made for all technical drawings to be suitably stored and a procedure operated to ensure that only drawings of the correct issue are released. A person should be made responsible for maintaining an up-to-date record of drawings available and also for notifying departments concerned when drawings have been superseded by a later issue.
- 14.10 The technical library must make arrangements for manuals or sections of manuals, schedules, service information, etc., appropriate to the work undertaken, to be made available to line maintenance stations and a suitable procedure maintained to ensure that such information is kept up-to-date.
- 14.11 Microfilm, microfiche and compact disk viewing and printing equipment must be available, as appropriate, at each location where manuals in these formats are in use, and in the library. Adequate arrangements must be made for regular maintenance of the equipment and users should be made aware of contact points for servicing and repair.

**15 SPARES**

- 15.1 *Provision and Storage.* The Operator must provide for sufficient spares to be available to ensure that aircraft, engine and equipment defects can be promptly rectified. Spares may be provided by either the Operator or the maintenance organisation, as contractually agreed, but must as far as possible be located where they will be required to be used.
- 15.2 Account must be taken of Operator's Minimum Equipment Lists (MEL) to ensure that essential spares to support the rectification of defects in systems required for operation are placed where they are most likely to be needed and in such numbers as to ensure that successive defects will be promptly addressed.
- 15.3 Operators may make arrangements with manufacturers and overhaul agencies for the provision of spares on demand subject to the arrangements being the subject of a firm contract. Spares obtained from another Operator or Maintenance Organisation will only qualify for installation if the source is considered to be acceptable within the criteria defined in CAD Airworthiness Notice 17.
- 15.4 The Director may require to examine spares provisioning arrangements and any agreements entered into to ensure that adequate support for defect rectification is being made. Where necessary the Director may require additional provisions to be made.
- 15.5 Spares provisions at each maintenance location should be determined when the particular base or station is commissioned and published in the company instructions/procedures defining the maintenance operations undertaken at the particular location.
- 15.6 Spares holdings should be reviewed at regular intervals at all locations to ensure that:-
- 15.6.1 Redundant items are removed, e.g. for aircraft no longer operated.
- 15.6.2 Superseded parts, or those with out of date modification states, are removed for replacement or up-dating.
- 15.6.3 Previously assessed numbers of spares remain adequate for support in relation to routes, frequency of flights and numbers of aircraft.
- 15.6.4 Airworthiness Directives and other mandatory requirements published while parts are in storage are complied with before the part is released for service.
- 15.7 *Storage Procedures.* All spares must be stored, at all times and locations, in such a manner as to ensure that they remain airworthy and fit for use when required. Parts must be used in rotation so that they remain in stores for as short a time as possible, i.e. first in - first out.
- 15.7.1 Procedures must be established to control the return to stores of items withdrawn for use but not needed, especially where the item has been installed in the aircraft and subsequently removed. The robbery of components from completed assemblies must be rigidly controlled and any removal positively identified.

- 15.7.2 Spares having a limited allowable shelf life, including materials and consumable products, must be identified and controlled.
- 15.7.3 Stores references or batch numbers should be recorded on worksheets, cards or technical log pages so as to facilitate subsequent tracing of the associated part to source.
- 15.7.4 Management procedures and conditions of storage must be reviewed regularly to ensure that satisfactory standards are being implemented.

## **16 INSTRUCTIONS TO FLIGHT CREWS**

- 16.1 Operators should arrange for written instructions to be included in the Operations Manual so that:-
  - 16.1.1 Aircraft commanders are advised of the action to be taken to obtain engineering assistance when aircraft are away from main base, of the procedures which are acceptable for any necessary certifications, and of the procedure to be adopted where any doubt exists over work being carried out by any other organisation, or which cannot be certified.
  - 16.1.2 Where no arrangements have been made in respect of engineering support at route stations, aircraft commanders are advised of the procedures to be followed for reporting defects to main base. See also Chapter 8 paragraph 9.
- 16.2 Where it is desired to transmit advisory information of a temporary nature to flight crews, e.g. in respect of modifications to the aircraft, trial installations or other changes which the crew need to be aware of during their operation of the aircraft, or which impose operating restrictions, an information sheet should be included in the Technical Log containing the relevant data.

## **17 AIRCRAFT REFUELLING - QUALITY ASSURANCE**

- 17.1 The Operator must be satisfied that of all fuel taken on board his aircraft is on specification and freedom from water and particulate contamination, which is fundamental for the safe operation of an aircraft.
  - 17.1.1 Fuel suppliers within Hong Kong are required to comply with the provisions of the AN(HK)O Article 82 concerned with Aviation Fuel at Aerodromes and must ensure that fuel dispensed is fit for use in aircraft. The Operator must comply with this Article himself if he has a facility or vehicle in which fuel is stored and/or delivered to aircraft.

- 17.2 The Operator is required to:-
- 17.2.1 Keep a record of the fuelling arrangements at each station where fuel is uplifted, indicating the company or person responsible for monitoring the fuel supplier. This may be a nominated airline at each location, or the Operator may, himself, choose to monitor the supplier's quality performance.
  - 17.2.2 Institute a fuel uplift sampling programme taking into account matters such as:-
    - 17.2.2.1 Known supplier quality performance, including any history of contamination.
    - 17.2.2.2 Local environmental conditions, e.g. likely sources of contamination including microbiological contamination.
    - 17.2.2.3 Supply facilities.
    - 17.2.2.4 Frequency of use.
  - 17.2.3 Provide flight crew with guidance on the accomplishment of fuel uplift sample checks and clear instructions as to when these are to be carried out.
  - 17.2.4 Provide maintenance personnel with guidance, in respect of fuel quality sampling, in relation to their station. Ensure that persons engaged in refuelling activities are properly trained for their tasks.
  - 17.2.5 Audit the arrangements as defined to ensure the continuing acceptability of fuel quality throughout the operation.
- 17.3 The minimum frequency of fuel contamination checking, at the point of uplift, must be declared in guidance to maintenance personnel and acceptable to the Director.
- 17.4 The Operator should ensure the control of fuel storage and dispensing by supplies conforms to the standards defined in CAD 748, Aircraft Fuelling and Fuel Installation Management. Therefore, operators should have a quality system to ensure that fuel suppliers at airports have established procedures on quality control of fuel supplied to aircraft. Such procedure should follow the specification, standards, and guidance developed and accepted by the fuel and aviation industry, such as but not limited to the followings:
- Note: Operators must be vigilant that any change in the fuel supply arrangement at an airport, such as change of fuel supplier or handling agent, major modification or addition related to fuel supply facilities, out of service of the supply system (including intrusive scheduled maintenance), replacement or modified equipment that is placed into operation, etc., would pose extra hazard of fuel contamination. Operators should conduct additional quality audit before accepting fuel from the affected supply system.
- 17.4.1 Based upon the aircraft engine and airframe manufacturers' operational specification requirements, the most common specifications for civil aviation turbine fuel Jet A-1 include:
    - 17.4.1.1 DEF STAN 91-91.

- 17.4.1.2 ASTMD 1655.
- 17.4.1.3 Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS).
- 17.4.1.4 GOST 10227 and GOST 52050.
- 17.4.1.5 CAN/CGSB-3-23.
- 17.4.1.6 Jetfuel Nr. 3 to GB6537
- 17.4.2 Energy Institute (EI):
  - 17.4.2.1 EI 1540 – Design, contraction, operation and maintenance of aviation fuelling facilities.
  - 17.4.2.2 EI 1550 - Handbook on equipment used for the maintenance and delivery of clean aviation fuel.
  - 17.4.2.3 EI 1585 - Guidance in the cleaning of aviation fuel hydrant systems at airports.
- 17.4.3 Joint Inspection Group (JIG):
  - 17.4.3.1 JIG 1 - Guidelines for Aviation Fuel Quality Control & Operating Procedures for Joint Into-Plane Fuelling Services.
  - 17.4.3.2 JIG 2 - Guidelines for Aviation Fuel Quality Control & Operating Procedures for Joint Airport Depots.
  - 17.4.3.3 JIG 3 - Guidelines for Aviation Fuel Quality Control & Operating Procedures for Jointly Operated Supply & Distribution Facilities.
  - 17.4.3.4 JIG Bulletin 39 - Fuel Hydrant Commissioning.
- 17.4.4 Air Transport Association of America (ATA):
  - 17.4.4.1 ATA 103 Specification: Standards for Jet Fuel Quality Control.
  - 17.4.4.2 ATA Airport Fuel Facility Operations and Maintenance Guidance Manual.
- 17.4.5 International Air Transport Association (IATA)
  - 17.4.5.1 IATA Guidance Material for Aviation Turbine Fuels Specifications, Part I - Guidance Material on Product Specifications.
  - 17.4.5.2 Airport Handling Manual (AHM).
  - 17.4.5.3 Standardized Into Plane Fuelling Procedures.
  - 17.4.5.4 Fuel Quality Pool (IFQP) - Control of Fuel Quality & Fuelling Safety Standards.

**18 ALL WEATHER OPERATIONS - MAINTENANCE REQUIREMENTS**

- 18.1 CAD 359 - Low Visibility Operations, defines the means by which an Operator can achieve approval to perform operations in Category II or III landing conditions. In order to perform such operations certain aircraft systems must be fully serviceable and the equipment in those systems must be to a defined modification standard.
- 18.2 The Operator or his maintenance organisation must publish guidance to maintenance personnel and flight crews on the control of the validity of all weather categorisation. This guidance should take the form of:-
- 18.2.1 A list of the systems required to be fully serviceable in order to qualify the aircraft for Category II or III operations.
- 18.2.2 A company procedure for the control of the modification status of the equipment fitted in the required systems which are deemed to be 'sensitive' in terms of all weather operations.
- 18.2.3 Placards applied to both equipment and installation to alert maintenance personnel to the need to fit only controlled equipment.
- 18.2.4 Procedures for downgrading all weather capability from Category III or II to Category I in the event that an uncontrolled item of equipment is fitted or after any defect in an affected system or any event which results in disturbance of the system.
- 18.2.5 Procedures for up-grading capability from Category I to Category II or III as appropriate when serviceability is proven, normally by performing a successful Category II approach or Category III landing in Category I weather conditions (sometimes referred to as a standard landing).
- 18.3 Provision should be made to inform the crew of the Category II or III status of the aircraft before the flight is begun.
- 18.4 When setting alert levels in system reliability monitoring, consideration must be given to the levels of reliability assumed in qualifying the aircraft for Category II or III operations. Significant trends must be responded to promptly or all weather classification must be suspended until remedial action has been taken.

NOTE: The published company procedure for controlling the engineering aspects of all weather operations, incorporating the subject included in this paragraph, forms part of the details required by the Director for grant of operational approval. It should, therefore, be sent to the CAD Airworthiness Office for assessment.

**19 PREPARATION OF AIRCRAFT FOR FLIGHT**

19.1 The AN(HK)O Article concerned with preflight action required to be taken by the aircraft commander prescribes that he satisfy himself that the aircraft is fit in every way to make the intended flight. In order to permit the Commander to discharge this responsibility in respect of the maintenance of the aircraft, the Operator must:-

19.1.1 Ensure that valid copies of the documents listed at paragraph 25 are carried.

19.1.2 Ensure that the Operations Manual and Maintenance Schedule contain details of a pre-flight inspection to be completed by the crew, or by maintenance personnel where available, with which to verify that the aircraft continues to be serviceable. Details of this inspection should also be included in the Technical Log.

19.1.3 Provide information, preferably, in the Technical Log, to advise the Commander when the next Scheduled Maintenance Inspection (SMI) is due, by flying hours and calendar time, any defects existing on the aircraft affecting its operational airworthiness and safety, and any maintenance actions falling due before the next SMI.

Where a procedure acceptable to the Director exists for the control of maintenance actions necessary between Scheduled Maintenance Inspections it may not be practicable to include full details in the Technical Log. In such cases it should be possible for flight crew to verify, with the assistance of maintenance personnel if necessary, that no maintenance task is due or will become due before the end of the intended flight.

19.1.4 Provide any other information to the crew concerning the aircraft and its systems, including changes resulting from modifications, which may affect operation of the aircraft.

19.1.5 Have management and quality assurance systems which will ensure that, whether the aircraft is dispatched by the Operator or the task is wholly or partly sub-contracted:-

19.1.5.1 Fuel uplifted prior to flight is free from contamination.

19.1.5.2 Refuelling of the aircraft is carried out in a controlled manner taking into account essential safety measures for fire prevention. CAD 74 - Aircraft Fuelling, provides guidance to all persons concerned with the fuelling of aircraft, including helicopters.

19.1.5.3 Baggage and cargo is loaded and restrained in accordance with Flight Manual limitations and that cargo doors are securely fastened.

- 19.1.5.4 Push-back and start-up are carried out to a standard procedure for the specific type of aircraft, under the control of a suitably trained person, that the area in which engines will be started is free from debris and contamination likely to damage the engines and that fire-fighting facilities are immediately available.

NOTE: It is recommended that ground personnel take appropriate precautions when push-back occurs during electrical storms and lightning. Interphone connection should not be made with the aircraft and dispatch instructions should be given with agreed hand signals.

- 19.1.5.5 Control surface and landing gear locks, restraint devices and blanks are removed.
- 19.1.5.6 Proper attention is given to the rectification of recorded defects, compliance with the MEL and any limitations imposed in respect of the period of flights, flying hours or calendar time, and
- 19.1.5.7 The aircraft is serviced and inspected as required by the approved maintenance schedule.

- 19.2 Where aircraft are not dispatched by or under the direct control of appropriately authorised maintenance personnel it must be ensured that persons performing dispatch tasks have been properly trained to do so and have been given written authority to that effect, and where tasks are divided between two parties the responsibilities of each are clearly defined.

Written authority may be granted individually or to a group of persons by virtue of a maintenance agreement, where the contracted party has its own system of authorisation.

Where flight crew personnel are authorised it is sufficient for the particular training and authority to be included in training records.

## **20 CABIN RECONFIGURATION - APPROVAL AND CONTROL**

- 20.1 Any change to the cabin configuration from that for which the aircraft was first certificated constitutes a modification which must be approved by the Director.
- 20.2 Revised or alternative seating layouts, the fitting of stretchers or the conversion of the cabin to a cargo carrying role all constitute modifications which must conform to an approved design and be certified with the issue of a Certificate of Release to Service (CRS) each time they are installed or the original configuration is restored. (See also paragraph 20.8).
- 20.3 The Operations Manual and instructions to maintenance personnel must contain precise description, preferably pictorial, of the approved configuration and any limitations to be observed. It is recommended that the various actions necessary are summarised in a checklist in each case, particularly in respect of the fitting or securing of emergency equipment and exits. Checklists should be readily available to personnel when carrying out configuration changes.

20.4 Where any possibility of error exists, such as in the position of seats and of fitting incorrect seats at and adjacent to emergency exits, the aircraft and the item to be fitted should be clearly marked and the pictorial diagram of the configuration should illustrate the arrangement.

20.5 Clear and easily interpreted guidance must be given to persons responsible for loading and securing the aircraft for flight so that the conditions of the approved modification are observed. In cases where the main cabin is used for the carriage of cargo it should be possible to readily install a configuration embodying methods of restraint which will ensure compliance with cabin design limitations without the need for extensive calculations at the point of dispatch.

It must be ensured that all cabin configurations are fully represented in APS weights and indices used in the loading calculations made prior to flight dispatch.

20.6 Approved modifications for cargo configurations should contain the various restraint practices used by the Operator to facilitate the satisfactory carriage of different types and sizes of load.

20.7 Operators must have a care and maintenance programme for cargo containers and pallets used either in cargo holds or the main cabin, particularly where the container itself is designed to provide necessary restraint and, in some cases, fire containment abilities.

Care and maintenance programmes must include details of permissible damage and any limitations, identify the positions of personnel in the company whose duties include the assessment of containers as fit for use (this will normally be a person who supervises the filling of containers), and details of action to be taken to route damaged containers to a CAD approved repair organisation.

Operators may arrange for containers damaged overseas to be repaired locally provided that the repair facility is appropriately approved by the responsible authority and details of the repair are recorded and certified.

## 20.8 **Certification of changes**

20.8.1 Certificates of Release to Service (CRS) must be issued for each change of configuration. The CRS must refer to the modification being embodied or removed but may do so through reference to a company instruction or role diagram etc which directly records compliance with the requirements of the modification.

20.8.2 Certificates of Release to Service may be issued by appropriately licensed or authorised personnel. Alternatively, Operators may apply to the Director through Airworthiness Office for exemption from the need to issue CRS subject to certain limitations and conditions which will be advised.

**21 BALLOONS**

- 21.1 The Operator must establish procedures to ensure:-
- 21.1.1 that all appropriate Maintenance Schedules, Maintenance Manuals, Service Bulletins, mandatory inspections/modifications publications and any other supporting information necessary for the maintenance of a particular balloon are available to personnel working on the balloon,
  - 21.1.2 that all such publications are kept up-to-date and that the Approved Maintenance Schedule is regularly reviewed to reflect the maintenance needs of the balloons,
  - 21.1.3 that all manufacturers' service information is evaluated and appropriate action taken as considered necessary,
  - 21.1.4 that all required scheduled maintenance, mandatory inspections/modifications and defect rectification are carried out,
  - 21.1.5 that all materials and parts used or held in storage have been obtained from acceptable sources and are fit for use,
  - 21.1.6 that storage conditions are satisfactory and batch control guarantees traceability to source,
  - 21.1.7 that calibration/servicing, where appropriate, of tools, test equipment or servicing rigs is carried out at the appropriate intervals and suitable records are maintained,
  - 21.1.8 that all technical documentation such as log books, work sheets etc., are maintained in a complete and up-to-date manner,
  - 21.1.9 that any outstanding defects considered acceptable for flight on completion of the particular scheduled maintenance are notified to the Commander and endorsed in the Technical Log,
  - 21.1.10 that the organisation responsible for type certification of each balloon type (usually the manufacturer), and the maintenance organisation, receive adequate reports of all airworthiness occurrences to that type, to enable the issue of appropriate service instructions and recommendations to all operators.

NOTE: Mandatory Occurrence Reporting is required by the Air Navigation (Hong Kong) Order in respect of public transport aircraft exceeding 2300 kg MTWA. It is recommended that balloon operators not affected by this requirement nevertheless report to the Director any occurrence interpreted as within the guidance given in CAD 382 - Mandatory Occurrence Reporting - Guidance and Information.

- 21.2 The Operator must establish a procedure acceptable to the Director to ensure that Commanders discharge the following responsibilities:-

- 21.2.1 that all routine servicing/maintenance is carried out including pre-flight check,
- 21.2.2 that defects affecting airworthiness or safe operation of the balloon are recorded in the Sector Record Page of the Technical Log,
- 21.2.3 ensure that defects are rectified before flight by appropriately qualified persons, or are deferred in a manner acceptable to the Director in accordance with the provisions of an allowance defects list.

## **22 AIRCRAFT EXTERNAL DAMAGE MARKING**

- 22.1 In the course of normal service, aircraft may suffer external damage in the form of scratches and minor dents as a result of collision with cargo and baggage loading equipment, access steps and vehicles.
- 22.2 Operators should have a system for identifying such damage after inspection and acceptance by the supporting maintenance organisation so that it is readily apparent when new damage occurs.
- 22.3 Damage should be entered in a record kept in the aircraft either directly on pictorial diagrams or by use of a grid referencing system. Such records may be included in the Technical Log or another readily available document.
- 22.4 When considered desirable as a means of prompt recognition of accepted damage it is acceptable for the actual damage to be marked using a suitable method of identification.
- 22.5 The damage record for each aircraft must be reviewed from time to time to ensure that it has been kept up to date, that repaired damage is removed from the record and that the cumulative effects of damage do not exceed manufacturer's limitations.

## **23 AIRCRAFT FURNISHINGS**

- 23.1 Operators and maintenance organisations must have adequate control over the cleaning of aircraft furnishing materials. For this, they need to have a knowledge of the material type, the recommended cleaning or proprietary finishing processing methods, the effects of time in service on the flame resistance properties, the flame retardant processes applied, if any, and the method of re-application of such a process, where this is necessary.
- 23.2 Where materials, e.g. seat covers, require the application of a proprietary flame retardant process in order to satisfy airworthiness requirements, it is strongly recommended that each item is identified with the number and type of cleaning actions it receives until it is re-proofed.

- 23.3 It is not acceptable to place reliance on unsubstantiated claims concerning the continuance of flame resistant properties of a material after durability or additional flame retarded processes have been applied. Where such processes have been applied, there is a need to prove the continued acceptability of a particular material or process in service, and, therefore, further flame resistance tests must be conducted in accordance with requirements identified in CAD Airworthiness Notices 58 and 59 as appropriate.

## 24 **THE MAINTENANCE OF CABIN AND OTHER SAFETY PROVISIONS**

- 24.1 Provisions made for the safety of passengers in flight and in the event of emergency alighting may be subject to abuse by passengers, either deliberately or by virtue of frequent use. It is therefore essential that regular inspections take place to ensure that the means by which the particular provision is implemented remain valid and any defined or implied inspection requirements are accomplished.

In some cases re-configuration of the cabin can result in seat positions, placards and emergency equipment being moved or omitted.

- 24.2 Subjects which require frequent monitoring include the following matters where the requirement has been notified as a CAD Airworthiness Notice, with, or without, a specific maintenance requirement:

- 24.2.1 Stowage and accessibility of lifejackets,
- 24.2.2 Continuing compliance, and test, of floor proximity escape path marking,
- 24.2.3 Testing of cabin and toilet smoke detector systems,
- 24.2.4 Access to and functioning of type III and IV exits,
- 24.2.5 Integrity of cargo compartment fire containment capability, linings and seals,
- 24.2.6 Inspection of catering carts and trolleys, brakes, restraints and placards,
- 24.2.7 Functional test of inflatable escape chutes and flotation devices (aeroplanes and helicopters),
- 24.2.8 Continuing integrity of toilet fire precautions,
- 24.2.9 Protection of liferafts and flotation bags from damage after deployment,
- 24.2.10 Compliance with approved cabin configurations for seat positions, access to exits and minimum space for seated passengers, particularly where seats are regularly removed and refitted,
- 24.2.11 Statutory provisions for the marking of exits and break-in areas.

**25 DOCUMENTS TO BE CARRIED**

- 25.1 Operators are to ensure that, unless specified otherwise in the AN(HK)O, valid copies of the following documents are carried on each flight:
- (a) Certificate of Registration.
  - (b) Certificate of Airworthiness.
  - (c) Certificate of Maintenance Review (if applicable).
  - (d) Technical Log.
  - (e) Noise Certificate (if applicable).
  - (f) Aircraft Radio Licence.
  - (g) Third Party Liability Insurance Certificate(s).

**26 ACCEPTABLE PERSONS FOR THE PURPOSE OF FURNISHING  
CERTIFICATES OF AIRWORTHINESS FLIGHT TEST REPORTS**

- 26.1 Companies operating Hong Kong registered aircraft are required to nominate to the CAD, pilots who will, on acceptance, have the responsibility to furnish to the CAD reports on C of A air tests. Experience levels of those persons submitted for consideration should conform to the guidelines set out in Appendix B of this Chapter.

**Air Operator's Certificates  
Maintenance Support**

**CAD 360  
Part TWO**

**CHAPTER 4 – APPENDIX A**

**Occurrence Report Form – DCA 201**

**Civil Aviation Department  
Hong Kong, China**

To be sent to : Flight Standards and Airworthiness Division  
Civil Aviation Department  
10/F., Commercial Building  
Airport Freight Forwarding Centre  
2 Chun Wan Road  
Chek Lap Kok  
Hong Kong

**OCCURRENCE REPORT (Mandatory / Voluntary)**

Complete all sections where information is relevant. For multi-choice boxes, indicate which entry is appropriate										Date received		Occurrence No.	
Aircraft Type and Series 1		Registration 2		Operator 3		Date of Occurrence 4		Flight Phase 24		Nature of Flight 25			
FLIGHT AND WEATHER DETAILS								PARKED		SCHED PAX			
FLIGHT No. 5								TAXYING		NON-SCHED PAX			
DAY LIGHT								TAKE-OFF		SCHED FREIGHT			
TWILIGHT								INIT CLIMB		NON-SCHED FREIGHT			
Wind 12								CLIMB		SURVEY			
Runway Used 16								CRUISE		PLEASURE			
Precipitation 18								DESCENT		CHECK/CALIBRATION			
Icing 19								HOLDING		BUSINESS			
Turbulence 20								APPROACH		CLUB/GROUP			
From 6								LANDING		PRIVATE			
Time 9								MISSED APPROACH		POSITIONING			
Height 13								CIRCUIT		FERRY			
State 17								AEROBATICS		TEST			
To 7								HOVER		TRAINING			
Time UTC 10													
Height ft 14													
O.A.T. °C 15													
Geog. Position 8													
Visibility 11													
O.A.T. °C 15													
Cloud Type Height/ft Amount/8ths 21								ETOPS 22 Yes/No		RVSM 23 Yes/No			
DRY/WET ICE/SNOW SLUSH													
TYPE OF OCCURRENCE													
AIR TRAFFIC RELATED 26				AERODROME & FACILITIES RELATED 27				FLIGHT OPERATIONS & AIRWORTHINESS RELATED 28					
ATC INCIDENT INVOLVING SAFETY				ACFT/VEHICLES/GRND EQUIP COLLISION				FLIGHT OPERATIONS PROCEDURES					
ATC PROCEDURES				AERODROME LIGHTING MARKING				ACFT ENGINEERING/MAINT./AIRWORTHINESS					
SEPARATION				OBSTRUCTIONS				OTHER IN-FLIGHT EMERCY.					
AIR SPACE				APRON BLAST									
R/T / COMMUNICATION				AERODROME FACILITIES									
ATC EQUIPMENT				BIRDSTRIKE				OTHER (PLS INDICATE) 29					
MET.SERVICES				NAV. AIDS									
INFORMATION				AERODROME SECURITY									
FOREIGN OBJECT				OTHER AERODROME INCIDENT									
UNDERSHOOT / OVERSHOOT													
ENGINE/COMPONENT DETAILS 30													
Any procedures, manuals, pubs (e.g. AIC, AD, SD etc) directly relevant to occurrence and (when appropriate) compliance state of aircraft, equipment or documentation													
ENGINE TYPE/SERIES		COMPONENT/PART		MANUFACTURER		PART NR	SERIAL NR	MANUAL REF	COMPONENT OH/REPAIR ORGANISATION				
UTILISATION – AIRCRAFT 31						UTILISATION – ENGINE/COMPONENT 32							
TOTAL		TOTAL		SINCE OH/REPAIR		SINCE INSPECTION							
Hours		Hours											
Cycles		Cycles											
Landings		Landings											
REPORT 33 ORIGINAL/SUPPL.				MANUFACTURER ADVISED 36 YES/NO				NAME 39		SIGNATURE			
INVESTIGATION 34 NIL/OPEN/CLOSE				FURTHER ACTION REQUIRED BY 37				POSITION 40		DATE 42			
FLIGHT DATA RECORD HELD 35 YES/NO				DIVISION/FAX 38				NAME OF EMPLOYER 41				43	

DCA 201 (12/99)

**CHAPTER 4 – APPENDIX A (Cont'd)**

**NARRATIVE**



**CHAPTER 4 APPENDIX B**

**ACCEPTABLE PERSONS FOR THE PURPOSE OF FURNISHING CERTIFICATE  
OF AIRWORTHINESS FLIGHT TEST REPORTS**

**1 General**

- 1.1 Aircraft on the Hong Kong register and those intended to be registered, are required to undergo an air test as part of the renewal/issue of the Certificate of Airworthiness (C of A). It is the responsibility of the company operating that aircraft to nominate to the CAD, individuals whom they consider would be persons acceptable to the CAD for the purpose of furnishing a report on an air test.
- 1.2 *Acceptability of an individual will be based upon experience, both in the aircraft concerned and upon his aviation experience in general and upon the result of an interview by CAD Flight Standards and Airworthiness Officers and at which a briefing will be given regarding his role and the conduct of the relevant air test.*
- 1.3 The initial issue and renewal of a C of A includes in the process, a report upon the results of an air test carried out on the specific aircraft. The report is furnished by a person who is acceptable to the CAD and who will normally be a pilot in the employment of the company operating that specific aircraft. A person accepted by the CAD for this purpose must be aware that whilst carrying out such duties, he is acting on behalf of the CAD.
- 1.4 A minimum experience level on the type of aircraft concerned or, in certain cases, on a 'broadly similar' type will be one of the requirements of the CAD. Whilst the number of flying hours is one yardstick used in the measurement of experience, it is appreciated that other qualifications could be equally acceptable and a shortfall in flying hours may well be replaced by some other recognised and pertinent qualification.
- 1.5 With regard to commercial aircraft, the proposed individual's Hong Kong license would require to be endorsed in Part 1 with that type and it is considered that a year as P1 on the type, which in the normal course of events would generate approximately 500 – 600 flight hours, would meet the experience requirement. Experience in a pilot training discipline, particularly in type conversion instruction or other related type-technical experience, would be an ideal qualification. Similarly, a test pilot qualification would be likely to satisfy the requirement. Where a new aircraft type is to be introduced into an operator's fleet, where no person holding the qualifications recommended by this document is available, then persons holding the required experience on a broadly-similar type will be considered. However, a prerequisite of this is that the person in question must have the new aircraft endorsed in Part 1 of his Hong Kong license. This waiver in type-related experience would not be applicable to helicopters.

- 1.6 For single-engine light aircraft types, ie. those aircraft with a Maximum Take Off Gross Weight not exceeding 2,730 kg, persons proposed to the CAD for acceptability should have a minimum total experience of 500 hours P1 on light aircraft and, in the case of multi-engine light aircraft, a total of 750 hours, of which 250 hours should be as P1 on multi-engine aircraft. A substitution of other, acceptable experience, as is the case with heavy aircraft, would be considered. In the case of a tail wheel configured aeroplane, at least 50 hours as P1 in such aircraft would be required.
- 1.7 When required, companies should submit the names of appropriately qualified persons to the airworthiness office of the CAD. Such a person will be interviewed by inspectors of the FSAD to confirm his acceptability and to explain his related duties. Indoctrination of a person identified as a potential candidate, should only commence after CAD acceptance.
- 1.8 Once a person has been accepted by the CAD, the operator concerned will be responsible for his indoctrination into the procedures and techniques required during a C of A air test. The extent of training lies with the operator. However, it is suggested that where possible, an approved flight simulator should be used to expose the newly-accepted person to one or more simulated flight tests. Additionally, he should observe, in a non-participating role, at least one actual air test. Subsequently, he should carry out at least one air test under the supervision of a pilot already accepted by the CAD for that purpose and who is experienced in the role. Where an appropriate flight simulator is not available additional observations of actual air tests would be a requirement.
- 1.9 Such a training scheme should appear in the company's Operations Manual and records of the relevant training of each individual should be kept. These records, which should include air tests undertaken, may be examined in the course of interim AOC inspections.
- 1.10 Where the requirement for air tests is infrequent, companies should ensure that those pilots involved are properly prepared prior to carrying out such a test.

## **CHAPTER 5 - MAINTENANCE FACILITIES**

### **1 GENERAL**

Facilities provided by the supporting maintenance organisation, at each location where maintenance is performed, must be adequate for the size and scope of the operation and be such as to enable personnel to perform their duties satisfactorily.

### **2 WORKING ACCOMMODATION**

2.1 Covered accommodation must be provided to house aircraft completely during Scheduled Maintenance Inspections except as may be agreed by the Director in a particular case. The accommodation should have a good standard of overall and concentrated lighting. The floors should be sealed to minimise dust and to assist in maintaining a satisfactory house-keeping standard.

2.2 Minor scheduled or pre-planned maintenance of aircraft in the open is acceptable provided it is closely controlled by the Operator/maintenance organisation concerned. It must be ensured that:-

2.2.1 work packages are continually assessed in order to determine that their contents do not include complex maintenance tasks which, with more effective planning, could be conducted at a maintenance base where covered accommodation is available;

2.2.2 due consideration is given to the weather conditions prevailing at the time the maintenance is being completed, including the extent of the external work required and the amount of protection given to the personnel involved;

2.2.3 there is sufficient ground servicing and support equipment for the tasks undertaken including provision of effective lighting, portable covers and access equipment.

2.3 Those areas of an aircraft that may require unscheduled work in the open, e.g. for rectification of defects, major replacements, or any work where the ingress of moisture, dust etc., could be detrimental, must be provided with protective cover against adverse weather conditions, and adequate lighting to facilitate the work.

### **3 MAINTENANCE EQUIPMENT**

3.1 Sufficient rostrums, stands or docks must be provided to permit access to all parts of the aircraft, together with suitable racks and stands for engines, aerofoil surfaces and other components removed from aircraft. Accommodation must also be provided for drawings, maintenance manuals, maintenance schedules, worksheets etc. Particular emphasis is placed on the need for complete docking installations for larger aircraft where positioning of rostrums, stands, ladders and lifts is time consuming and their use does not provide comprehensive access to upper surfaces of wings, fuselage and tail.

- 3.2 Equipment necessary for the completion of work required by the approved Maintenance Schedule must be available, together with any special test equipment needed for the diagnosis of faults and related functional checks specified in the relevant technical publications.

#### **4 TEST FACILITIES AND TOOLS**

- 4.1 The organisation must have, or must have access to, suitable facilities for carrying out such tests as are necessary to establish compliance with the appropriate standards and specifications.
- 4.2 Maintenance equipment, tools and test equipment should be controlled to ensure that they remain fit for use when required and, where necessary, serviced or calibrated at such intervals as necessary to maintain confidence in their accuracy. Equipment and tools should be marked with the date when the next check is due.

#### **5 OFFICE ACCOMMODATION**

- 5.1 Suitably furnished offices for quality control and inspection staff and supervisors should be provided and should be such that manuals and drawings may be studied and aircraft maintenance documents may be controlled, completed and checked without undue disturbance.

#### **6 STORAGE FACILITIES**

- 6.1 A controlled stores area must be provided at each location where spare parts and materials are held, and a person should be appointed to be responsible for its day-to-day operation. A secure area must also be provided where it is necessary to segregate parts and materials which are unfit, or improperly certified for aircraft use.
- 6.2 Suitable controlled arrangements must be made for the storage of bulk items such as wheels, brakes, engines, propellers and major aircraft assemblies which cannot be housed in the main store.
- 6.3 Provision must be made for the storage of:-  
  
Tools and Equipment,  
'Pre-load' items awaiting immediate fitting to the aircraft to rectify deferred or carried forward defects,  
Flammable Materials.
- 6.4 The environmental conditions in all storage facilities must be such as to ensure that parts and materials are maintained in a fit condition for use throughout their period of storage.

## **7 WORKSHOPS**

7.1 Workshop facilities are not normally the subject of an investigation for AOC purposes. Overhaul and repair services provided by the maintenance organisation must be the subject of direct approval by the Director in accordance with the provisions of HKAR-145.

7.2 It is permissible, however, for tasks directly associated with the maintenance of the aircraft to be carried out in workshops specially designed to facilitate the task. Such tasks include power plant and wheel build-up, battery testing and charging, sheet metal work and the servicing of seats, galleys and furnishings.

NOTE: Procedures must be in place to ensure that components removed from aircraft for repair and return to service on the same aircraft are properly controlled and that all work is certified by issuing a CRS.

7.3 All such workshop activities must be the subject of investigation and agreement by the CAD Airworthiness Office. Acceptable conditions for CAD agreement include:-

7.3.1 All workshops should be equipped with effective lighting and should be kept clean and free of extraneous materials.

7.3.2 Where hydraulic component rectification and testing is undertaken, positive segregation of the work and test areas for components in which incompatible fluids are used should be provided.

7.3.3 Separate battery servicing and charging facilities must be provided for lead acid and nickel cadmium batteries.

7.3.4 Stripping and cleaning areas of workshops should be segregated from the assembly and inspection areas.

7.3.5 Workshops should be equipped with the necessary tools and equipment and, where applicable, functional test sets or rigs to enable checks specified in the approved technical publications to be properly completed. In addition, workshops should have adequate bins or racking for components awaiting overhaul or rectification, and suitable benches for dismantling, local cleaning, rectification, inspection, reassembly and test.

## **8 LINE MAINTENANCE FACILITIES**

8.1 The numbers and qualifications of staff at line stations must be sufficient to perform the tasks allocated to the station. Shift arrangements must ensure that persons are available when needed and to ensure continuity of control over servicing and dispatch activities. Arrangements must be made to ensure that on-coming shifts are made fully aware of any outstanding or incomplete task.

8.2 Scheduled or pre-planned tasks must only be allocated to line stations where sufficient staff and down-time are available to perform the task, in a manner commensurate with its airworthiness significance, the working conditions are appropriate to the nature of the task and the necessary tools, equipment, test apparatus and technical instructions are available.

- 8.3 Each line station must be provided with:-
- 8.3.1 A summary of the technical literature provided for the station. The list should be kept up-to-date and made available to the technical library so that amendments and periodic checks of currency can be made.
  - 8.3.2 A summary of the station spares holding with an indication of which items are held for priority purposes, e.g. to meet possible MEL compliance requirements or ETOPS dispatches etc.
  - 8.3.3 Company procedures and technical instructions appropriate to the aircraft types supported.
  - 8.3.4 Such extracts from the maintenance schedule, in the form of worksheets or cards etc., as are necessary to perform the tasks allocated to the station.
  - 8.3.5 Access to deferred and repetitive defect information to assist in the diagnosis of reported defects.
  - 8.3.6 Details of any subcontracts for line support, fuel supply, loading and ground handling entered into by the Operator to enable the person responsible for dispatch to ensure that all significant airworthiness tasks are satisfactorily accomplished.
  - 8.3.7 Maintenance facilities and working accommodation appropriate to the scale of work and undertakings of the station.
  - 8.3.8 Ground support equipment as appropriate including equipment or access to equipment for the ground de-icing, anti-icing of aircraft as necessary.
- 8.4 **Ground De-icing and Anti-icing**
- 8.4.1 It must be ensured that de-icing equipment is checked immediately before the commencement of winter operations and at intervals throughout the winter season to verify that the equipment is fully serviceable at each location where aircraft are likely to require de-icing.
  - 8.4.2 Items such as mixer nozzles must be correctly calibrated and it must be ensured that they are not replaced with incorrectly calibrated nozzles during the winter season.
  - 8.4.3 Satisfactory procedures for testing mixtures of de-icing fluids must be established together with suitable conditions for the storage and identification of de-icing fluid.
  - 8.4.4 Where facilities for common use are provided at airports or this task is contracted-out to a specialist organisation such audit checks must be carried out by the Operator as are necessary to ensure that de-icing/anti-icing of his type of aircraft will be carried out effectively and in a manner to ensure subsequent safe operation.

**8.5 Balloons**

- 8.5.1 No scheduled or unscheduled tasks may be carried out on a balloon in the open during adverse weather conditions. All work must be completed in conditions appropriate to the task being undertaken with adequate lighting, heating etc., and such as to avoid ingress of moisture or other contaminants detrimental to the balloon or its components.
- 8.5.2 Equipment necessary for the completion of work required by the approved maintenance schedule must be available together with any special test equipment needed for the diagnosis and rectification of defects. Where some of the specialist tasks are sub-contracted to another organisation/person, it must be shown that any necessary equipment can be provided on site within a reasonable time period appropriate to the nature of balloon operation.
- 8.5.3 It is the responsibility of the Operator to ensure that balloons are stored and transported in such a manner, and with adequate protection, so as to ensure continuing airworthiness and security from damage and other deterioration.

## **CHAPTER 6 - QUALITY CONTROL AND ASSURANCE\***

### **1 GENERAL**

- 1.1 The operator's systems for quality control and assurance must take into account all of the facilities and procedures utilised to ensure continued airworthiness at each of the Operator's locations where activities take place affecting the airworthiness of the aircraft.
- 1.2 Quality control must therefore be effective throughout the operation and maintenance of aircraft and quality auditing must ensure that control is being properly applied and achieving satisfactory results.
- 1.3 The organisation's quality control policies and systems must be described in the Exposition or Engineering Manual together with the Quality Assurance audit programme.

### **2 PROCEDURES**

- 2.1 An operator should designate a quality manager to monitor compliance with, and adequacy of, procedures required to ensure safe maintenance practices and airworthy aircraft. Compliance monitoring should include a feedback system to the quality manager to ensure corrective action as necessary.
  - 2.1.1 The quality manager must be acceptable to the Director-General.
- 2.2 Staff assigned to quality control and assurance duties must be:-
  - 2.2.1 sufficiently experienced in the company systems and procedures and technically knowledgeable of the aircraft being maintained so as to enable them to perform their duties satisfactorily;
  - 2.2.2 experienced in the techniques of quality control and assurance or receive suitable training before taking up their duties.

- 
- \* **Quality Control** A management system for programming and co-ordinating airworthiness standards within an organisation to provide for maintenance, overhaul, repair and defect rectification to be accomplished in compliance with CAD requirements, together with the specific company or customer requirements and continuing airworthiness.
  - \* **Quality Assurance** Overall supervision of airworthiness achievement to ensure that the standards set by the system of Quality Control are enforced.

2.2.3 given clearly defined terms of reference and responsibility within the organisation.

NOTE: This is particularly important where QC/QA personnel are also expected to perform other duties in the organisation, e.g. to issue CMR or other maintenance certification.

2.3 The department responsible for Quality Control and Assurance must arrange for independent quality audit checks to be carried out on a planned basis. Emphasis should be placed on the company systems employed to achieve and ensure airworthiness, their suitability and effectiveness. The scope of quality checks within the organisation should follow the guidelines given at Appendix A to this Chapter.

2.4 All quality checks must be recorded and assessed and any criticisms forwarded to the person responsible for the particular facility or procedure for corrective action to be taken. There must be a feed-back system for confirming to the quality assurance staff that corrective action has been taken and to ensure that persons concerned with any audit deficiency are kept aware of both the adverse report and the outcome.

**CHAPTER 6 APPENDIX A - QUALITY CONTROL AND ASSURANCE**

1 Quality Assurance procedures should ensure that audit checks are carried out as follows:

NOTE: This summary of quality assurance checks is not exhaustive but is intended to provide an indication of the range of checks necessary. Additional or difference checks may be needed in respect of particular support arrangements.

1.1 Checks on aircraft while undergoing scheduled maintenance for:-

1.1.1 compliance with maintenance schedule requirements and ensuring that only worksheets and cards reflecting the latest amendment standard are used,

1.1.2 completion of worksheets, including the transfer of defects to additional worksheets; their control, and final assembly. Action taken in respect of items carried forward, not completed during the particular inspection or maintenance task,

1.1.3 compliance with manufacturers' and company standard specifications,

1.1.4 standards of inspection and workmanship,

1.1.5 conservation of aircraft, corrosion prevention techniques and other protective processes,

1.1.6 procedures adopted during shift-changeover to ensure continuity of inspection and responses,

1.1.7 precautions taken to ensure that all aircraft are checked, on completion of any work or maintenance, for loose tools and miscellaneous small items such as split pins, wire, rivets, nuts, bolts and other debris, general cleanliness and housekeeping.

1.2 Checks on aircraft in service for:-

1.2.1 compliance with company approved practices for cargo restraint, load distribution and spreading, such that the approved modifications for cargo configurations are observed,

1.2.2 procedures to ensure that the APS weight data in use reflects the aircraft configuration and the weight and balance schedule,

1.2.3 satisfactory condition of cargo/baggage compartments and their linings, cargo handling and restraint equipment and special provisions for the carriage of livestock and attendants,

1.2.4 continuing compliance with Hong Kong Airworthiness Notices in respect of cabin and other safety provisions. (Chapter 4 paragraph 20).

**CHAPTER 6 APPENDIX A (Cont'd)**

- 1.3 Checks on Technical Logs for:-
  - 1.3.1 correct completion of sector record pages and their transmission to technical records,
  - 1.3.2 satisfactory rectification of defects or their deferral in accordance with the MEL and company procedures. The recording of component details and stores control numbers, cross-referencing to deferred defect records and additional worksheets where appropriate and the inclusion of rectification details in the Sector Record Page,
  - 1.3.3 compliance with required reporting procedures in the event of flights taking place after rectification of defects without issue of a Certificate of Release to Service,
  - 1.3.4 certification of modifications including the installation of role equipment such as stretchers and conversion of the aircraft from passenger to cargo roles, and return to passenger,
  - 1.3.5 correct use of maintenance and inspection control systems included in the technical log for the completion of scheduled and pre-planned tasks between Scheduled Maintenance Inspections,
  - 1.3.6 operation of systems for recording external damage to the aircraft which has been inspected and is considered safe for further operation.
- 1.4 Checks on Technical Service Information for:-
  - 1.4.1 adequacy of aircraft manuals and other technical information appropriate to each aircraft type, including engines, propellers and other equipment, and the continuing receipt of revisions and amendments,
  - 1.4.2 assessment of manufacturers service information, determining its application to the Operator's aircraft and the recording of compliance or embodiment in each aircraft,
  - 1.4.3 maintaining a register of manuals and technical literature held within the company, their locations and current amendment states,
  - 1.4.4 ensuring that all company manuals and documents, both technical and procedural, are kept up-to-date.
- 1.5 Checks on the Company's general Airworthiness Control Procedures for:-
  - 1.5.1 responding to the requirements of Airworthiness Directives, mandatory modifications and inspections, CAD Airworthiness Notices and special fleet checks instituted in response to occurrences etc,
  - 1.5.2 monitoring company practices in respect of scheduling or pre-planning maintenance tasks to be carried out in the open, and adequacy of the facilities provided,

**CHAPTER 6 APPENDIX A (Cont'd)**

- 1.5.3 effective completion of maintenance reviews at intervals required by the approved maintenance schedule and the availability of information to the certificate signatory,
- 1.5.4 operation of the defects analysis system for the Operator's airframes, engines and systems and its integration with the system for mandatory occurrence reporting; the highlighting of repetitive defects and the control of deferred defects,
- 1.5.5 authorisation of personnel to perform inspections and maintenance tasks on the Operator's aircraft and for the issue of CMR and CRS; the effectiveness and adequacy of training and the recording of personnel experience, training and qualifications for grant of authorisation,
- 1.5.6 the effectiveness of technical instructions issued to maintenance staff,
- 1.5.7 the adequacy of staff in terms of qualifications, numbers and ability in all areas of support for the Operator which affect airworthiness,
- 1.5.8 the efficacy and completeness of the quality audit programme,
- 1.5.9 compliance with the requirements of the approved Maintenance Schedule, including maintenance/inspection periods, component overhaul/test/calibration control, records of cycles/landings etc and for granting variations at the request of the Operator,
- 1.5.10 maintaining logbooks and other required records on behalf of the Operator,
- 1.5.11 ensuring that major and minor repairs are only carried out in accordance with approved repair schemes and practices.
- 1.6 Checks on Stores and Storage Procedures for:-
  - 1.6.1 the adequacy of stores and storage conditions for rotatable components, small parts, perishable items, flammable fluids, engines and bulky assemblies,
  - 1.6.2 the procedure for examining incoming components, materials and items for conformity with order, release documentation and approved source,
  - 1.6.3 the 'batching' of goods and identification of raw materials, the acceptance of part life items into stores, requisition procedures,
  - 1.6.4 labelling procedures, including the use of serviceable/unserviceable/repairable labels, and their certification and final disposal after installation. Also labelling procedures for components which are serviceable but 'part life' only,

**CHAPTER 6 APPENDIX A (Cont'd)**

- 1.6.5 the internal release procedure to be used when components are to be forwarded to other locations within the organisation,
- 1.6.6 the procedure to be adopted for the release of goods or overhauled items to other organisations. (This procedure should also cover items being sent away for rectification or calibration),
- 1.6.7 the procedure for the requisitioning of tools together with the system for ensuring that the location of tools is known at all times,
- 1.6.8 control of shelf life and storage conditions in the stores. Control of the free-issue dispensing of standard parts, identification and segregation.
- 1.7 Checks on Maintenance Facilities for:-
  - 1.7.1 cleanliness, state of repair and correct functioning of hangars, hangar facilities and special equipment, and the maintenance of mobile equipment,
  - 1.7.2 adequacy and functioning of special services and techniques including welding, NDI, weighing, painting,
  - 1.7.3 viewer/printer equipment provided for use with micro-fiche, micro-film and compact disk ensuring regular maintenance takes place and an acceptable standard of screen reproduction and printed copy are achieved,
  - 1.7.4 the adequacy of special tools and equipment appropriate to each type of aircraft, including engines, propellers and other equipment.
- 1.8 Checks at Line and Route Stations, in addition to the foregoing as applicable for:-
  - 1.8.1 the adequacy of facilities and staff,
  - 1.8.2 the provision of covered accommodation for aircraft when maintenance is undertaken which requires a controlled environment, and for the accomplishment of work in the open where this is unavailable,
  - 1.8.3 the cleanliness, state of repair, correct functioning and maintenance of ground support equipment including ground de-icing/anti-icing equipment,
  - 1.8.4 the effectiveness of any sub-contracted arrangements for ground handling, servicing and maintenance support and compliance with the operator's contracted arrangements,

**CHAPTER 6 APPENDIX A (Cont'd)**

- 1.8.5 monitoring of fuel quality from the airport depot to into-plane fuelling services, which should include the quality control surveillance procedures and operating practices to manage product movement through the supply chain to mitigate product quality risks. Particular attention should be paid to the regular contamination checks, monitoring of unusual pressure or flow rate during uplift, and the effectiveness and completion of fuel tank water drain check. The various controls and procedures should reflect a philosophy of product traceability and segregation to prevent contamination. Refer Chapter 4 paragraph 17 Aircraft Fuelling – Quality Assurance for guidance material in developing the appropriate audit check list.
- 1.8.6 the care and maintenance of cargo containers, freight nets, pallets and other cargo equipment,
- 1.8.7 the currency, scope and effectiveness of locally raised technical instructions and the procedure for bringing them to the notice of maintenance personnel,
- 1.8.8 adequacy of the technical publications held at the station for the operator's aircraft, their currency and procedures for amendment,
- 1.8.9 the accuracy and control of worksheets or cards, to ensure that only up-to-date issues are used.

**CHAPTER 6 APPENDIX A (Cont'd)**

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## **CHAPTER 7 - MAINTENANCE MANAGEMENT EXPOSITION**

### **1 GENERAL**

- 1.1 The Operator is required to provide a description of his maintenance support arrangements for the direction and guidance of flight crew and maintenance personnel engaged in the day to day operation and maintenance support of his aircraft, throughout his operating network.

The Maintenance Management Exposition is also required as a basis for CAD acceptance of the arrangements, a pre-requisite for the grant of an AOC. The Maintenance Management Exposition and any subsequent amendment must be accepted by the Director.

- 1.2 For the purposes of Part Two, this description of the arrangements will be referred to as the MAINTENANCE MANAGEMENT EXPOSITION but may take other forms in practice, as defined in this Chapter.
- 1.3 The Operator may:-
- 1.3.1 publish a discrete Maintenance Management Exposition containing a full description of the support provided for his Operation or,
  - 1.3.2 use the Operations Manual to satisfy the requirement for a Maintenance Management Exposition including the necessary details as a Volume, Section or Chapter of that manual as appropriate or,
  - 1.3.3 refer in his Maintenance Management Exposition to the Exposition of the approved maintenance organisation for those parts of the maintenance arrangements which are described therein or,
  - 1.3.4 use the Exposition of the approved maintenance organisation to describe the whole of his maintenance arrangements.
- 1.4 Where the Operator's maintenance organisation does not hold CAD Approval, or holds an approval for which an Exposition is not required, the Director will accept a document prepared by that organisation as a substitute provided it conforms to the requirements for an Exposition.
- 1.5 The Director will require to hold copies of the Exposition as dictated by the nature of the operation and the necessary surveillance.
- 1.6 Operators of balloons may utilise a section of the Operations Manual to describe all of their maintenance arrangements.

## **2 PREPARATION OF THE EXPOSITION**

- 2.1 The purpose of the Maintenance Management Exposition is to describe the maintenance arrangements made by the Operator to support his operation, in accordance with the requirements of this Document. The design of the Manual shall observe Human Factors principles. The contents of the Manual should therefore address all of the subjects included in Part Two of this document. The Contents List given at the front of this document may be used as a summary of subjects to be included in the Maintenance Management Exposition.

Whether details appear in the Operator's Maintenance Management Exposition or in the maintenance organisation's Exposition will depend on the nature of the relationships between the two parties.

- 2.2 It is apparent from the foregoing that the Operator will need to liaise closely with his maintenance organisation in the preparation of his Maintenance Management Exposition, to take advantage of those aspects of his maintenance support which are adequately described in the Exposition of the maintenance organisation.
- 2.3 It is recommended that the Maintenance Management Exposition is divided into parts appropriate to the functions of maintenance. The Exposition in particular should be divided between main base and line maintenance functions and may be further subdivided for ease of use and to facilitate its management.
- 2.4 In preparing the Maintenance Management Exposition, account should be taken of CAD/CAA publications and other sources of information, including:-

CAD 74	Aircraft fuelling - fire prevention and safety measures for the fuelling of aeroplanes and helicopters
CAD 145	HKAR-145 Approved Maintenance Organisation
CAD 360	Air Operator's Certificates Requirements Document
CAD 382	The Mandatory Occurrence Reporting Scheme
CAD 418	Condition Monitored Maintenance
CAD 434	Aviation Fuel at Aerodromes
CAD 455	Hong Kong Airworthiness Notices
CAP 512	Ground De-icing of Aircraft
CAD 513	Extended Range Twin Operations
CAP 520	Light Aircraft Maintenance

CAD 554      HKAR-1    Airworthiness Procedures

CAD 549      HKAR-MMEL/MEL    Master Minimum Equipment List/  
Minimum Equipment List

CAP 562      Civil Aircraft Airworthiness Information and Procedures

Flight Operations Notice

Hong Kong Aeronautical Information Circulars

Hong Kong Airworthiness Information Leaflet

- 2.5      Where a maintenance organisation provides all or part of the support for more than one Operator it should be possible to clearly identify the support provided for each operator in the Maintenance Management Exposition or its Maintenance Organisation Exposition.
- 2.6      The Operator shall ensure that the Maintenance Management Exposition is amended as necessary to keep the information contained therein up to date. Copies of all amendments to the Maintenance Management Exposition shall be furnished promptly to all organisations or persons to whom the Exposition has been issued.
- 2.7      Appendix A to this Chapter is an example of Maintenance Management Exposition for an Operator who is also approved in accordance with HKAR-145.
- 2.8      Appendix B is an example of Maintenance Management Exposition for an Operator who is NOT approved in accordance with HKAR-145.

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CHAPTER 7 - APPENDIX A

**Maintenance Management Exposition for an Operator  
who is also approved in accordance with HKAR-145**

The Exposition may be put together in any subject order and subjects combined so long as all applicable subjects are covered.

**PART 0 GENERAL ORGANISATION**

**0.1 Corporate commitment by the Operator**

**0.2 General information**

- **Brief description of organisation**

*(This paragraph should describe broadly how the whole organisation is organised under the management of the accountable manager, and should refer to the organisation charts of paragraph 0.3)*

- **Relationship with other organisations**

- **Fleet composition**

*(This paragraph should quote the fleet's aircraft types and the number of aircraft of each type.)*

- **Type of operation**

*(This paragraph should give broad information on the type of operations such as: long haul / short haul / regional, scheduled / charter, regions / countries / continents flown, etc)*

- **Line station locations**

*(Depending on the size of the network, this paragraph may either quote the line station or refer to a list available to the Director-General)*

**0.3 Maintenance management personnel**

- **Accountable manager**

*(This paragraph should address the duties and responsibilities of the accountable manager as far as CAD 360 Part Two is concerned and demonstrate that he has corporate authority for ensuring that all maintenance activities can be financed and carried out to the required standard.)*

CHAPTER 7 - APPENDIX A (Cont'd)

- **Nominated postholder**

*(This paragraph should:*

- *emphasize that the nominated postholder for maintenance is responsible to ensure that all maintenance is carried out on time to an approved standard,*
- *describe the extent of his authority as regards his AOC responsibility for maintenance.)*

- **Maintenance co-ordination**

*(This paragraph should list the job functions that constitute the "group of persons" as required by CAD 360 Part One Chapter 3 in enough detail so as to show that all the maintenance responsibilities are covered by the persons that constitute that group. In the case of small organisation, where the "nominated postholder for maintenance" constitutes himself the "group of persons", this paragraph may be merged with the previous one.)*

- **Duties and responsibilities**

*(This paragraph should further develop the duties and responsibilities of:*

- *the personnel listed in "maintenance coordination",*
- *the quality manager, as regards the quality monitoring of the maintenance system which includes the HKAR-145 maintenance organisation(s).)*

- **Organisation chart(s)**

*(The flow charts should:-*

- *provide a comprehensive understanding of the whole company's organisation,*
- *give further details on the maintenance management system, and should clearly show the independence of the quality monitoring system, including the links between the quality department and the other departments.)*

**CHAPTER 7 - APPENDIX A (Cont'd)**

**- Manpower resources and training policy**

*(This paragraph on manpower resources should give broad figures to show that the number of people dedicated to the performance of the approved maintenance activity is adequate. It is not necessary to give the detailed number of employees of the whole company but only the number of those involved in maintenance.*

*This paragraph on training policy should show that the training and qualification standards for the personnel quoted above are consistent with the size and complexity of the operation. It should also explain how the need for recurrent training is assessed and how the training recording and follow-up is performed.)*

**0.4 Notification procedure to the Director-General regarding changes to the Operator's maintenance arrangements / locations / personnel / activities / approval**

*(This paragraph should explain in which occasion the company should inform the Director-General prior to incorporating proposed changes.)*

**0.5 Exposition amendment procedures**

*(This paragraph should explain who is responsible for the amendment of the exposition and submission to the Director-General for approval. This may include, if agreed by the Director-General the possibility for the approved organisation to approve internally minor changes that have no impact on the approval held. The paragraph should then specify what type of changes are considered as minor and major and what are the approval procedures for both cases.)*

**PART 1 MANAGEMENT**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

**PART 2 MAINTENANCE PROCEDURES**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

**PART L2 ADDITIONAL LINE MAINTENANCE PROCEDURES**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

**CHAPTER 7 - APPENDIX A (Cont'd)**

**PART 3 QUALITY SYSTEM PROCEDURES**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

Qualifying operator's maintenance personnel not covered by HKAR-145.

NOTE: The Quality System procedures shown in App. B (Part 2 Quality System) must also be taken into account.

**PART 4 CONTRACTED OPERATORS**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

**PART 5 APPENDICES (Sample of Documents)**

*(This forms part of the Exposition of the HKAR-145 approved maintenance organisation.)*

**PART 6 AOC MAINTENANCE PROCEDURES**

**6.1 Aircraft technical log utilisation and MEL application**

**Aircraft technical log**

**- General**

*(It may be useful to remind, in this introduction paragraph, the purpose of the aircraft technical log system.)*

**- Instructions for use**

*(This paragraph should provide instructions for using the aircraft technical log. It should insist on the respective responsibilities of the maintenance personnel and operating crew. Samples of the technical log should be included in order to provide enough detailed instructions.)*

**- Aircraft technical log approval**

*(This paragraph should explain who is responsible for submitting the aircraft technical log any subsequent amendment to the Director-General for approval and what is the procedure to be followed.)*

**CHAPTER 7 - APPENDIX A (Cont'd)**

**MEL application**

*(Although the MEL is a document that is normally not controlled by the maintenance management system of the operator, and that the decision of whether accepting or not a MEL tolerance normally remains the responsibility of the operating crew, this paragraph should explain in sufficient detail the MEL application procedure, because the MEL is a tool that the personnel involved in maintenance have to be familiar with in order to ensure proper and efficient communication with the crew in case of a defect rectification to be deferred. This paragraph does not apply to those types of aircraft that do not have an MEL.)*

- **General**

*(This paragraph should explain broadly what an MEL document is. The information could be extracted from the operator's Aircraft Flight Manual.)*

- **MEL classes**

*(Where an operator uses a classification system placing a time constraint on the rectification of such defect, it should be explained here what are the general principle of such a system. It is essential for the personnel involved in maintenance to be familiar with it for the management of MEL's deferred defect rectification.)*

- **Application**

*(This paragraph should explain how the maintenance personnel identifies an MEL limitation to the crew. This should refer to the Technical Log procedures.)*

- **Acceptance by the crew**

*(This paragraph should explain how the crew notifies his acceptance or non acceptance of the MEL deferment in the technical log)*

- **Management of the MEL time limits**

*(After a technical limitation is accepted by the crew, the defect must be rectified within the time limit specified in the MEL. There should be a system to ensure that the defect will actually be corrected before that limit. This system could be the aircraft technical log for those small operators that use it as a planning document, or a specific follow-up system for those operators that control the maintenance time limit by another means such as data processed planning systems.)*

- **MEL time limitation overrun**

*(The Director-General may grant the operator to overrun MEL time limitation under specified conditions. Where applicable this paragraph should describe the specific duties and responsibilities for controlling these extensions.)*

CHAPTER 7 - APPENDIX A (Cont'd)

6.2 Aircraft maintenance programme - development and amendment

- **General**

*(This introductory paragraph should remind that the purpose of a maintenance programme is to provide maintenance planning instructions necessary for the safe operation of the aircraft.)*

- **Content**

*(This paragraph should explain what is(are) the format(s) of the company's aircraft maintenance programme(s).)*

- **Development**

- **Sources**

*(This paragraph should explain what are the sources (MRB, MPD, Maintenance Manual, etc.) used for the development of an aircraft maintenance programme.)*

- **Responsibilities**

*(This paragraph should explain who is responsible for the development of an aircraft maintenance programme.)*

- **Manual amendments**

*(This paragraph should demonstrate that there is a system for ensuring the continuing validity of the aircraft maintenance programme. Particularly, it should show how any relevant information is used to update the aircraft maintenance programme. This should include, as applicable, MRB report revisions, consequences of modifications, manufacturer's and authority recommendations, in service experience, and reliability reports.)*

- **Acceptance by the Director-General**

*(This paragraph should explain who is responsible for the submission of the maintenance programme to the Director-General and what is the procedure to follow. This should in particular address the issue of the Director-General's approval for variation to maintenance periods.)*

**CHAPTER 7 - APPENDIX A (Cont'd)**

**6.3 Time and maintenance records, responsibilities, retention, access**

**- Hours and cycles recording**

*(The recording of flight hours and cycles is essential for the planning of maintenance tasks. This paragraph should explain how the maintenance management organisation has access to the current flight hours and cycle information and how it is processed through the organisation.)*

**- Maintenance records**

*(This paragraph should give in detail the type of company document that are required to be recorded and what are the recording period requirement for each of them. This can be provided by a table or series of table that would include the following:*

- *Family of document (if necessary),*
- *Name of document,*
- *Retention period,*
- *Responsible person for retention,*
- *Place of retention.)*

**- Maintenance records preservation**

*(This paragraph should set out the means provided to protect the records from fire, floods, etc. as well as the specific procedures in place to guarantee that the records will not be altered during the retention period (especially for the computer record).)*

**- Transfer of maintenance records**

*(This paragraph should set out the procedure for the transfer of maintenance records, in case of both purchase/lease-in and sale/lease-out of an aircraft. In particular, it should specify which records have to be transferred and who is responsible for the coordination (if necessary) of the transfer.)*

**6.4 Accomplishment and control of Airworthiness Directives**

*(This paragraph should demonstrate that there is a comprehensive system for the management of Airworthiness Directives. This paragraph may for instance include the following sub-paragraphs:)*

CHAPTER 7 - APPENDIX A (Cont'd)

- **Airworthiness Directive information**

*(This paragraph should explain what are the Airworthiness Directive information sources and who receive them in the company. Where available, redundant sources (e.g. authority plus manufacturer or airline association) may be useful.)*

- **Airworthiness Directive decision**

*(This paragraph should explain how and by whom the Airworthiness Directive information is analyzed and what kind of information is provided to the HKAR-145 contracted organisations in order to plan and to perform the Airworthiness Directive. This should as necessary include a specific procedure for emergency Airworthiness Directive management.)*

- **Airworthiness Directive control**

*(This paragraph should specify how the operator manages to ensure that all the applicable Airworthiness Directives are performed and that they are performed on time. This should include a close loop system that allows to verify that for each new or revised Airworthiness Directive and for each aircraft:*

- *the Airworthiness Directive is not applicable or,*
- *if the Airworthiness Directive is applicable:*
  - *the Airworthiness Directive is not yet performed but the time limit is not overdue,*
  - *the Airworthiness Directive is performed, and any repetitive inspection are identified and performed.*

*This may be a continuous process or may be based on scheduled reviews.)*

**6.5 Analysis of the effectiveness of the maintenance programme**

*(This paragraph should show what tools are used in order to analyze the efficiency of the maintenance programme, such as:*

- *PIREPS,*
- *air turn-backs,*
- *spare consumption,*
- *repetitive technical occurrence and defect,*

**CHAPTER 7 - APPENDIX A (Cont'd)**

- *technical delays analysis (through statistics if relevant),*
- *technical incidents analysis (through statistics if relevant), etc.*

*The paragraph should also indicate by whom and how these data are analyzed, what is the decision process to take action and what kind of action could be taken. This may include:*

- *amendment of the maintenance programme,*
- *amendment of maintenance or operational procedures, etc.)*

**6.6 Non-mandatory modification embodiment policy**

*(This paragraph should specify how the non-mandatory modification information are processed through the company, who is responsible for their assessment against the operator's own need and operational experience, what are the main criteria for decision and who take the decision of implementing (or not) a non-mandatory modification.)*

**6.7 Major modification standards**

*(This paragraph should set out a procedure for the assessment of the approval status of any major modification before embodiment. This will include the assessment of the need of a Director-General's approval for modification already approved by another civil aviation authority (such as STC and SB). It should also identify the type of approval required (according to the HKAR-1 Sub-section 1.8-8 design organisation approvals as applicable), and the procedure to follow to have a modification approved by the Director-General (or in accordance with a procedure acceptable to the authority).)*

**6.8 Defect reports**

**- Analysis**

*(This paragraph should explain how the defect reports provided by the HKAR-145 contracted organisations are processed by the maintenance management organisation. Analysis should be conducted in order to give elements to activities such as maintenance programme evolution and non mandatory modification policy.)*

**- Liaison with manufacturers and regulatory authorities**

*(Where a defect report shows that such defect is likely to occur to other operator's, a liaison should be established with the manufacturer and the certification authority, so that they may take all the necessary action.)*

CHAPTER 7 - APPENDIX A (Cont'd)

- **Deferred defect policy**

*(Defects such as cracks and structural defect are not addressed in the MEL and CDL. However, it may be necessary in certain cases to defer the rectification of a defect. This paragraph should establish the procedure to be followed in order to be sure that the deferment of any defect will not lead to any safety concern. This will include appropriate liaison with the manufacturer.)*

**6.9 Engineering activity**

*(Where applicable, this paragraph should expose the scope of the operator's engineering activity in terms of approval of modification and repairs. It should set out a procedure for developing and submitting a modification/repair design for approval to the Director-General and include reference to the supporting documentation and forms used. It should identify the person in charge of accepting the design before submission to the Director-General. Where the operator has got a design approval from the Director-General under the HKAR-1 Sub-section 1.8-8, it should be indicated here and the related manuals should be referred.)*

**6.10 Reliability programmes**

*(This paragraph should explain with enough detail the management of a reliability programme. It should at least address the following:*

- *extent and scope of the operator's reliability programmes,*
- *specific organisational structure, duties and responsibilities,*
- *establishment of reliability data,*
- *analysis of the reliability data,*
- *corrective action system (maintenance programme amendment),*
- *scheduled reviews (reliability meetings, the participation of the Director-General.)*

*This paragraph may be, where necessary, subdivided as follows:*

- *Airframe*
- *Propulsion*
- *Components.)*

**CHAPTER 7 - APPENDIX A (Cont'd)**

**6.11 Pre-flight inspection**

*(This paragraph should show how the scope and definition of preflight inspection, that are usually performed by the operating crew, is kept consistent with the scope of the maintenance performed by the HKAR-145 contracted organisations. It should show how the evolution of the preflight inspection content and the maintenance programme are concurrent, each time necessary.)*

*The following paragraphs are self explanatory. Although these activities are normally not performed by maintenance personnel, these paragraphs have been placed here in order to ensure that the related procedures are consistent with the line maintenance activity procedures.*

- *Preparation of aircraft for flight*
- *Sub-contracted ground handling functions*
- *Security of cargo and baggage loading*
- *Control of refuelling, quantity/quality*
- *Control of snow, ice, dust and sand contamination to an approved standard.)*

**6.12 Aircraft weighing**

*(This paragraph should state in which occasion an aircraft has to be weighed (for instance after a major modification because of weight and balance operational requirements, etc.), who performs it, according to which procedure, who calculates the new weight and balance and how the result is processed into the organisation.)*

**6.13 Flight test procedures (could be covered in Part 2, Maintenance Procedures)**

*(The criteria for performing a flight test are normally included in the aircraft maintenance programme. This paragraph should explain how the flight test procedure is established in order to meet its intended purpose (for instance after a heavy maintenance check, after engine or flight control removal installation, etc.), and the release procedures to authorise such a flight.)*

**6.14 Sample of documents, tags and form used**

**6.15 Leasing of aircraft and related aeronautical products**

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**CHAPTER 7 - APPENDIX B**

**Maintenance Management Exposition for an Operator  
who is NOT approved in accordance with HKAR-145**

The Exposition may be put together in any subject order so long as all applicable subjects are covered.

**PART 0 GENERAL ORGANISATION**

(as shown in Appendix A)

**PART 1 AOC MAINTENANCE PROCEDURES**

(as shown in Appendix A, Part 6 entitled - AOC MAINTENANCE PROCEDURES)

**PART 2 QUALITY SYSTEM**

**2.1 Maintenance quality policy, plan and audit procedures**

**- Maintenance quality policy**

*(This paragraph should include a formal quality policy statement, that is a commitment on what the quality system is intended to achieve. It should include at the minimum monitoring compliance with CAD 360 Part Two and any additional standards specified by the company.)*

**- Quality plan**

*(This paragraph should show how the quality plan is established. The quality plan will consist of a quality audit and sampling schedule that should cover all the areas specific to CAD 360 Part Two in a definite period of time. However, the scheduling process should also be dynamic and allow for special evaluations when trends or concerns are identified.)*

**- Quality audit procedure**

*(The quality audit is a key element of the quality system. Therefore, the quality audit procedure should be sufficiently detailed to address all the steps of an audit, from the preparation to the conclusion, show the audit report format (e.g. by reference to "sample of document"), and explain the rules for the distribution of audit reports in the organisation (e.g. involvement of the quality manager, accountable manager, nominated postholder for maintenance, etc.).)*

**CHAPTER 7 - APPENDIX B (Cont'd)**

**- Quality audit remedial action procedure**

*(This paragraph should explain what system is put in place in order to ensure that the corrective actions are implemented on time and that the result of the corrective action meets the intended purpose. For instance, where this system consists in periodical corrective actions review, instructions should be given how such reviews should be conducted and what should be evaluated.)*

**2.2 Monitoring of maintenance management activities**

*(This paragraph should set out a procedure to periodically review the activities of the maintenance management personnel and how they fulfil their responsibilities, as defined in Appendix A Part 0.)*

**2.3 Monitoring the effectiveness of the maintenance programme**

*(This paragraph should set out a procedure to periodically review that the effectiveness of the maintenance programme is actually analyzed as defined in Appendix A Paragraph 6.5.)*

**2.4 Monitoring that all maintenance is carried out by an appropriate HKAR-145 organisation**

*(This paragraph should set out a procedure to periodically review that the HKAR-145 approval of the contracted maintenance organisations are relevant for the maintenance being performed on the operator's fleet. This may include feedback information from any contracted HKAR-145 organisation on any actual or contemplated certificate amendment, in order to ensure that the maintenance system remains valid and to anticipate any necessary change in the maintenance agreements.*

*If necessary, the procedure may be subdivided as follows:*

- Aircraft maintenance*
- Engines*
- Components.)*

**2.5 Monitoring that all contracted maintenance is carried out in accordance with the contract, including sub-contractors used by the maintenance contractor**

*(This paragraph should set out a procedure to periodically review that the maintenance management personnel are satisfied that all contracted maintenance is carried out in accordance with the contract. This may include a procedure to ensure that the system allows all the personnel involved in the contract (including the contractors and his subcontractors) to be acquainted with its terms and that, for any contract amendment, relevant information is dispatched in the organisation and to the contractor.)*

**CHAPTER 7 - APPENDIX B (Cont'd)**

**2.6 Quality audit personnel**

*(This paragraph should establish the required training and qualification standards of auditors. Where persons act as a part time auditor, it should be emphasized that this person must not be directly involved in the activity he audits.)*

**PART 3 CONTRACTED MAINTENANCE**

**3.1 Maintenance contractor selection procedure**

*(This paragraph should explain how a maintenance contractor is selected by the operator. Selection should not be limited to the verification that the contractor is appropriately approved in accordance with HKAR-145 for the type of aircraft, but also that the contractor has the industrial capacity to undertake the operator's maintenance. This selection procedure should preferably include a contract review process in order to insure that:*

- *the contract is comprehensive and that no gap or unclear area remains,*
- *everyone involved in the contract (both at the operator and at the maintenance contractor) agrees with the terms of the contract and fully understand his responsibility,*
- *that functional responsibilities of all parties are clearly identified.)*

**3.2 Detailed list of maintenance contractors**

**3.3 Relevant technical procedures identified in the maintenance contract(s)**

*(This paragraph should include all specific technical procedure established for the purpose of a particular contract. This may be for instance specific procedures for maintenance records keeping, control of the airworthiness directives, etc.)*

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## **CHAPTER 8 - THE TECHNICAL LOG**

### **1 GENERAL**

- 1.1 A Technical Log is required to be kept for any aircraft with a Certificate of Airworthiness in either the Transport or Aerial Work Category and at the end of every flight (except as indicated below) the aircraft commander must enter the following details:-
  - 1.1.1 The times when the aircraft took off and landed.
  - 1.1.2 Particulars of any defect known to him if it affects the airworthiness or safe operation of the aircraft, (if there are no defects the aircraft commander must make an entry to this effect).
  - 1.1.3 Any other particulars required by the Director.
  - 1.1.4 His/her signature and the date.
- 1.2 If the aircraft is 2730 kg or less MTWA and is not operated by the holder of an AOC (or by a person who is required to hold an AOC) the Director may approve a different record (see paragraph 5 "Alternative Records").
- 1.3 If a number of consecutive flights occur within the same period of 24 hours at the same aerodrome with the same aircraft commander, all entries may be made at the end of the last flight unless a defect becomes known to the commander in the meantime, which must be entered as it occurs.

### **2 CAD REQUIREMENTS**

- 2.1 In addition to the particulars required by the Air Navigation (Hong Kong) Order, as indicated above, the Technical Log may contain maintenance control and Flight Crew advisory information for use during the routine operation of the aircraft between scheduled maintenance inputs to main base.
- 2.2 The log must contain pre-serialised Sector Record Pages of a design acceptable to the Director, provision to record acceptable deferred defects which are awaiting rectification, a valid Certificate of Maintenance Review and a Maintenance Statement.

### **3 THE SECTOR RECORD PAGE**

- 3.1 Each sector record page must include provision to record:-
  - 3.1.1 The aircraft type and registration.

- 3.1.2 The date, place and times of take-off and landing.
- 3.1.3 The name and address of the Operator (the address may be omitted if it is printed on the title page to the Log).
- 3.1.4 Particulars of defects.
- 3.1.5 The post-flight signature of the aircraft commander and the date.
- 3.1.6 The pre-flight signature of the commander's acceptance of the aircraft and the date.
- 3.1.7 The fuel state on arrival.
- 3.1.8 Details of rectification action taken in respect of defects together with a pre-printed Certificate of Release to Service (CRS) in such a position as to be readily identifiable with the defect entry to which it relates (Provision should also be made for CRS signature with the date and authority for issue).
- 3.1.9 The quantities of fuel and oil uplifted and the quantity available in each tank or combination of tanks at the beginning of each flight.

The format in which fuel quantities are recorded must encourage the identification of any gross errors present in the quantity of fuel on board, e.g. by comparison of the calculated and actual fuel uplifted, using the recorded fuel on arrival. Common units of quantity should be used within columns or provision should be made in the record for the conversion of units to a standard.

- 3.1.10 The running total of flying hours so that the flying hours remaining to the next inspection can be readily determined, and the date of such inspection.
- 3.1.11 The completion of preflight and/or daily inspections.
- 3.1.12 The times when de-icing was started and completed, unless otherwise agreed with the Director.
- 3.1.13 It may also be necessary to record additional information for specific aircraft. Examples include:-
  - 3.1.13.1 Maximum or Intermediate Contingency Power. It is necessary to record the duration of maximum and intermediate contingency power usage, and subsequently to transfer the information to the engine log book or maintenance record. For rotorcraft the record of each use of such power settings must also subsequently be transferred to the log cards or other appropriate documents applicable to those components of the transmission which always transmit the power from a single engine only, i.e. components upstream of any combining gearbox.

3.1.13.2 Landings.

3.1.13.3 Flight Pressure Cycles.

3.1.13.4 This list is not exhaustive and additional records may be required. The supplementary information to be recorded should be assessed by the Operator in consultation with the relevant maintenance organisation and submitted for agreement to the Director.

3.2 The Sector Record Page layout should be divided to show clearly what is required to be completed after flight and what is required to be completed in preparation for the next flight.

3.3 Typical layouts for Sector Record Pages are shown in the Appendices to this Chapter:

- Appendix A Multiple Sector Record
- Appendix B Single Sector small aircraft record
- Appendix C Single Sector large aircraft record
- Appendix D Balloons

#### **4 RETENTION OF RECORDS**

4.1 All entries made on a Sector Record Page must be made in duplicate with provision for one copy of each entry to be removed from the Technical Log and retained on the ground before the next flight commences.

In the case of an aeroplane not exceeding 2730 kg MTWA or a helicopter, if it is not reasonably practicable for a copy of the Sector Record Page to be kept on the ground, it may be carried in the aeroplane or helicopter in a container approved for the purpose by the Director.

4.2 Arrangements must be made to extract information recorded in the Sector Record Page for use by the maintenance organisation. Additional copies of the page may be necessary for this purpose.

4.3 All entries in the Sector Record Page must be retained by the Operator for a period of not less than two years after the particular aircraft has been destroyed or permanently withdrawn from service except that the Director may consider a different retention period in a particular case.

Where the Operator arranges for the relevant maintenance organisation to retain copies of Sector Record Pages on his behalf he will nevertheless continue to be responsible for the records under the AN (HK) O Article relating to the preservation of records. If he ceases to be the operator of the aircraft he also remains responsible for transferring the records, if requested, to any other person who becomes the Operator of the aircraft.

## **5 ALTERNATIVE RECORDS**

- 5.1 In circumstances when the operator of an aircraft with a Certificate of Airworthiness in the Transport Category is permitted to use an alternative form of record the following arrangements must be made if the aircraft undertakes a flight or flights for the purpose of public transport. The pertinent details must be transferred to the Sector Record Page from the Alternative Record, including:-
- 5.1.1 Total flight hours.
  - 5.1.2 Hours to next maintenance check and date of such check.
  - 5.1.3 Any acceptable deferred defects awaiting rectification (It is strongly recommended that the standard record of deferred defects is utilised for all aircraft, whether a full Sector Record Page or Alternative Record is used, see Appendix E).
  - 5.1.4 Any maintenance actions falling due before the next scheduled maintenance inspection (see paragraph 7, Maintenance Statement).

When the aircraft returns to non-AOC flying the above details must be transferred to the alternative record to ensure continuity of maintenance control.

NOTE: The form of alternative record must be approved by the Director. Operators are advised to contact the Director for guidance before considering the adoption of such a record. Use of the alternative record is only permitted for flights made by aircraft that are not operated by a person who holds, or is required to hold, an AOC.

- 5.2 Alternative records and any Sector Record Pages completed during the period must be made available to the maintenance organisation when the aircraft is presented for the accomplishment of scheduled maintenance so that a full assessment of the maintenance needed by the aircraft can be verified.
- 5.3 Use of an alternative record does not alter the Operator's responsibilities for recording defects as they become known to the Commander and for their rectification. Where defects are deferred, or transferred to aircraft log books for entry of rectification details and issue of CRS, detailed cross-referencing must be included so that continuity of maintenance actions can be established.

## **6 ACCEPTABLE DEFERRED DEFECTS**

- 6.1 A procedure for deferring the rectification of defects where this is permitted by the Minimum Equipment List (MEL) for that aircraft should be published in the Operations Manual and Engineering Technical Procedures. A suitable record sheet for this purpose is shown at Appendix E, however, Operators may develop procedures and records more suited to their methods of defect control, and to permit, for example, recording of rectification attempts and component replacement.

6.2 The Director will investigate operator's procedures for deferring defects at the time of application for an AOC to ensure that they will be effective, in practice, and result in defects remaining unrectified for minimum periods. Any change in procedures must be notified to the Director for further investigation.

6.3 When a defect is to be transferred, the 'Action Taken' column of the Sector Record should be completed in the following manner:-

Transferred to ADD Record sheet serial No. .... Item No. ....

Signed .....

Date .....

6.3.1 Details of the defect, Sector Record page serial number, signature of person authorising deferral and date (or aircraft hours) of origin, should be entered on the ADD Record. The period for which the deferred defect may be carried should also be stated in accordance with the company procedure.

6.3.2 On rectification of the defect it is necessary to enter on the current Sector Record page:-

6.3.2.1 the ADD Record sheet serial number and items number,

6.3.2.2 details and date of the original defect and of the rectification, together with the applicable component change date or other action, and to complete the Certificate of Release to Service. The 'Defect Cleared' columns of the ADD Record must then be signed and dated.

6.4 Completed ADD Records may be removed from the Technical Log at each Scheduled Maintenance Inspection. Where single defects remain current on each page, resulting in numerous pages being carried in the log it is acceptable to consolidate these entries on to a single page for ease of assessment by the crew. When this occurs the original date of entry must be retained so that the duration of entry can be readily established.

Where deferred defects are transferred to worksheets at maintenance periods there should be a procedure to ensure that defects which have not been actioned are re-entered on a new deferred defect record sheet, ensuring that the original date of the defect is retained.

## **7 THE MAINTENANCE STATEMENT**

7.1 The purpose of the Maintenance Statement is to advise the Aircraft Commander and maintenance personnel of the forthcoming maintenance requirements.

7.2 The statement is to be completed by the maintenance organisation following each scheduled maintenance inspection and should include details of all out-of-phase

inspections and component changes etc., falling due prior to the next SMI. Where these are too numerous to include in a Maintenance Statement or the Operator wishes to provide for repeated inspections, etc., alternative procedures and recording systems may be adopted with the agreement of the Director.

NOTE: Where scheduled maintenance inspections may be completed as a line maintenance function the Maintenance Statement may be of a form which enables the accomplishment of such minor inspections within the overall validity period of the Statement.

7.3 A specimen Maintenance Statement is shown at Appendix F.

7.4 A specimen Certificate of Maintenance Review is shown at Appendix G.

## **8 PROCEDURES**

8.1 Detailed instructions should be given to flight crew in the Operations Manual and to maintenance engineers in Engineering Manuals on the manner in which the Technical Log is to be used and completed. These should be repeated in the Log itself if necessary to ensure a disciplined response by pilots and engineers.

8.2 Specific guidance should be given in respect of special inspections, Line Maintenance Requirements, Notices to Crew, External Damage Recording systems and compliance with short-term mandatory requirements etc., which may also be included in the Technical Log.

8.3 As a general rule one legible copy of each Sector Record Page should remain in the log for a sufficient period to permit the identification of a repetitive defect by maintenance engineers at the point of operation. Similarly deferred defect records should not be removed prematurely. It will be necessary to ensure a balance exists between permitting a degree of defect analysis on the aircraft on the one hand and preventing a situation in which too many pages, particularly of deferred defects, obscures the airworthiness status of the aircraft.

8.4 In cases when the copy of the Sector Record Page provided for maintenance control is not extracted directly by the maintenance organisation, Operations Manual procedures must show the responsibilities of the Operator for removing and dispatching completed pages to that organisation. It is essential that details of flights undertaken and any defects, whether rectified or deferred are advised promptly to the maintenance organisation, so that maintenance planning and spares provision can be effective.

## **9 FLIGHTS WITH UNCERTIFIED RECTIFICATION OF DEFECTS**

9.1 The Air Navigation (Hong Kong) Order permits an aircraft to be flown to a place where a Certificate of Release to Service can be issued for the rectification of a defect when the aircraft is at a place where it is not reasonably practicable to do so.

- 9.2 If such a flight is undertaken the Commander of the aircraft must notify the Director within ten days, giving particulars of the flight and the reasons for making it. The flight itself must be to the nearest place where the necessary certification can be made, it must be flown by a route for which it is properly equipped, and must take into account any hazards to the liberty or health of the persons on board.

All reports should be addressed as noted below. Any operational aspects will then be coordinated with the assigned Flight Operations Inspector. Reports should include the following details:-

- 9.2.1 Aircraft Type, Registration, Date, Time, Place and Flight Number.
- 9.2.2 Technical Log reference for Sector Record Page on which the defect is recorded, and the "Carried Forward Defect" number.
- 9.2.3 Description of Defect and Rectification.
- 9.2.4 Person/Organisation who carried out the work, and confirmation that the Operator's maintenance organisation was consulted and authorised this course of action.
- 9.2.5 Whether or not a duplicate inspection was necessary and, if so, who carried it out.
- 9.2.6 An indication of whether normal operation of the aircraft was affected (altitude, route, etc).
- 9.2.7 Name and signature of the aircraft commander.

NOTE: Reports should be addressed to the CAD, Airworthiness Office. It is recommended that Operators prepare a reporting form with provision for entering the above information and arrange for copies to be available to the flight crew.

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CHAPTER 8 - APPENDIX C

Single Sector Large Aircraft Record

Operator .....		Captain .....		A/C Reg. ....		Date: .....		Serial No: .....	
Defects		Action Taken Inc. Component Details		Flight No:		To		Hrs Min	
No. ....		.....		.....		Land		.....	
.....		.....		From		T.O.		.....	
.....		.....		Airborne Time		.....		.....	
.....		.....		Total Log Time B/F		.....		.....	
.....		.....		Total Log Time		.....		.....	
.....		.....		No. of Landings		.....		.....	
.....		.....		Inspection Type Completed		.....		.....	
.....		.....		Time		Date		.....	
.....		.....		Signature		.....		.....	
.....		.....		Oil Topped Up		.....		.....	
.....		.....		Refuelled by		.....		.....	
.....		.....		NOTE: I hereby certify that the amounts of fuel and oil stated are on board this a/c at time of departure.		Total Fuel on Board		..... kg	
.....		.....		Name		Sign		.....	
.....		.....		CAPTAINS ACCEPTANCE OF AIRCRAFT & REPLENISHMENT LOG		Name		Sign	
.....		.....		Name		Date		.....	
.....		.....		NOTE: ANY DEFECTS TRANSFERRED TO THE DEFERRED DEFECT SHEET FROM THIS PAGE MUST BE CROSS REFERENCED TO THIS PAGE.		.....		.....	

  

<p><b>CERTIFICATE OF RELEASE TO SERVICE</b> - The work recorded above has been carried out in accordance with the requirements of the Air Navigation (Hong Kong) Order for the time being in force, and in that respect the aircraft/equipment is considered fit for Release to Service.</p>																																															
<p>Signed: ..... Captain (inbound)</p>																																															
<p><b>FUEL RECORD:</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">PORT</td> <td colspan="2">STBD</td> <td colspan="2">TOTAL</td> </tr> <tr> <td>3</td><td>2</td><td>1</td><td>1</td><td>2</td><td>3</td> </tr> <tr> <td>Arrival</td><td>Upfltr</td><td>Depart</td><td>Adjust 2</td><td>Depart</td><td>TOTAL</td> </tr> <tr> <td>3</td><td>2</td><td>1</td><td>1</td><td>2</td><td>3</td> </tr> <tr> <td colspan="2">*Water Methanol</td> <td colspan="2">*Oil</td> <td colspan="2">*State Units</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>TOTAL</td><td>.....</td> </tr> </table>												PORT		STBD		TOTAL		3	2	1	1	2	3	Arrival	Upfltr	Depart	Adjust 2	Depart	TOTAL	3	2	1	1	2	3	*Water Methanol		*Oil		*State Units		1	2	3	4	TOTAL	.....
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<p>Ground De-icing (if applicable)</p> <p>Commenced .....</p> <p>Finished .....</p> <p>Signature .....</p>																																															
<p>Fuel Upfltr Check (litres)</p> <p>Refuelling Vehicle: .....</p> <p>Calculated: .....</p>																																															

NOTES: (1) This is a specimen only. Operators may need to change the layout or introduce additional items to suit their individual requirements.

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**CHAPTER 8 - APPENDIX D**

**Balloons**

**Technical Log Sector Record Page  
Loadsheet and Passenger Manifest**

Operator			Reg.	Serial No.																																		
		<table border="1" style="width: 100%;"> <tr><td colspan="2">Permitted Lift Calc</td></tr> <tr><td>Datum Temp</td><td>C</td></tr> <tr><td>Press Alt</td><td>ft</td></tr> <tr><td>Max lift/1000 cu/ft</td><td></td></tr> <tr><td></td><td>lb</td></tr> <tr><td>Balloon Volume</td><td></td></tr> <tr><td></td><td>cu/ft</td></tr> <tr><td>Total Permitted Lift</td><td>lbs</td></tr> </table>		Permitted Lift Calc		Datum Temp	C	Press Alt	ft	Max lift/1000 cu/ft			lb	Balloon Volume			cu/ft	Total Permitted Lift	lbs	<table border="1" style="width: 100%;"> <tr><td>Captain</td><td>Date</td></tr> <tr><td></td><td></td></tr> </table>	Captain	Date																
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<p><small>CERTIFICATE OF RELEASE TO SERVICE - The Work recorded above has been carried out in accordance with the requirements of the Air Navigation (Hong Kong) Order for the time being in force, and in that respect the balloon/equipment is considered fit for release to Service.</small></p>				Item Nos.	Signed	Authority	Date																															

\*Strike out if a defect entry is made

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**CHAPTER 8 - APPENDIX F**

**Maintenance Statement**

<b>MAINTENANCE STATEMENT</b>			
Aircraft Type: _____	Registration Mark: _____		
The next SCHEDULED MAINTENANCE INSPECTION is due at: _____		hrs	
on: _____			
The following out of phase inspections/component changes are due before the next Scheduled Maintenance Inspection specified above:			
Item	Due		Sector Log Reference on Completion
	Hrs	Date	
This maintenance statement is not complete unless a valid Certificate of Maintenance Review is attached.			

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**CHAPTER 8 - APPENDIX G**

**CERTIFICATE OF MAINTENANCE REVIEW**

<b>CERTIFICATE OF MAINTENANCE REVIEW</b>	
Aircraft Type: .....	
Registration Mark: .....	
Certified that a maintenance review of this aircraft and such of its equipment as is necessary for its airworthiness has been carried out in accordance with the requirements of the Air Navigation (Hong Kong) Order for the time being in force.	
The next maintenance review is due .....	
	Signed.....
	CAD Approval/Licence .....
	Date .....
	Organisation .....